In This Issue—*Piece Work and the Flat Rate*

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MOTOR AGE

Vol. XLII
Number 10

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CHICAGO, SEPTEMBER 7, 1922

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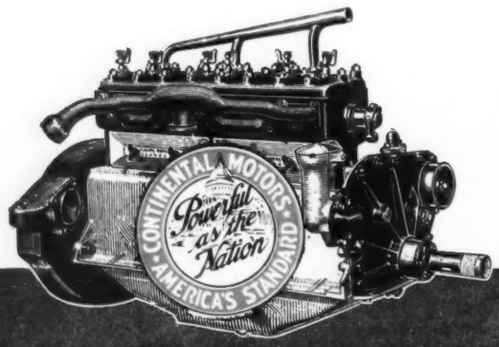

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MOTOR AGE

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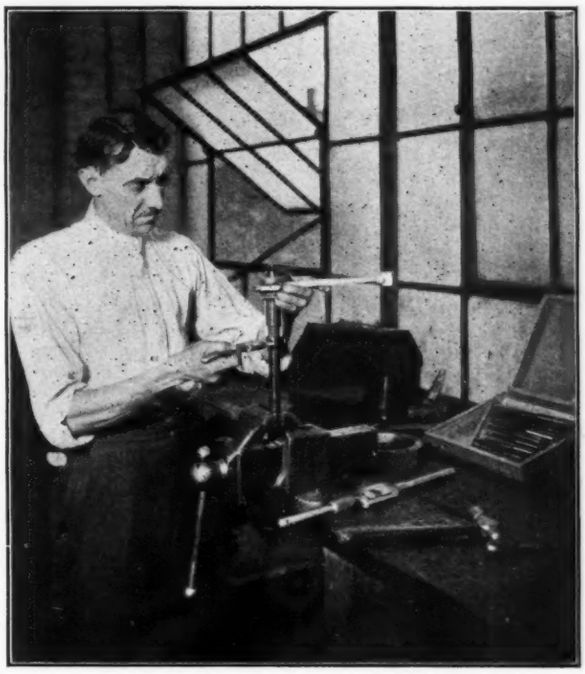

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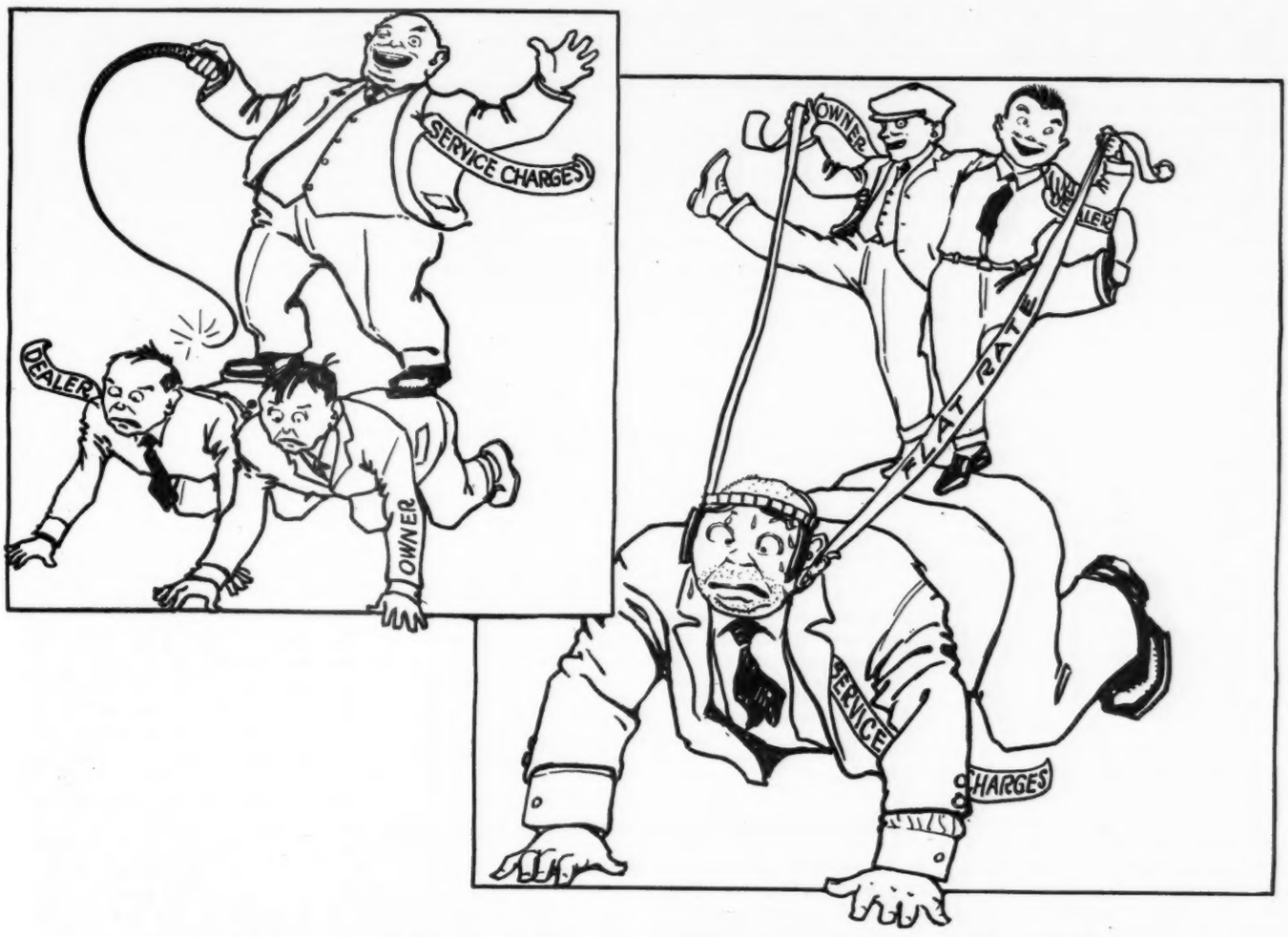


Cadillac Flat Rate Piece Work Plan Proves a Success

By J. EDWARD SCHIPPER

THE most frequent recommendation of the flat rate or fixed price system of selling maintenance, is "The customer knows in advance just what the job is going to cost." This is, no doubt, a strong point for the flat rate system, but it represents only one of the advantages.

There are several distinct advantages from the dealer standpoint. One of the foremost of these advantages lies in the fact that the system offers an opportunity to put the shop on a piece work basis. Off hand, the shop men are likely to say this would result in a lowering of their compensation, but further on in this article we show that in a large shop which put in a piece work system the men now are making on an average of 25 per cent more money than under the old, so much per hour, rate. Not only that, the system automatically eliminates the poor mechanic and each man is given an opportunity to show his ability.

Much has been said about the benefits of the flat rate system as applied to the car owner, as well as to the shop. When worked out in connection with piece work, however, the angle

of the mechanic enters very deeply into the problem. The Cadillac Motor Car Co. maintenance station in Detroit has installed such a system and one of the problems in connection with this installation was the proper working out of the compensation of the men in order that they would fully get into the spirit of the flat rate system and, at the same time, handle the work more expeditiously while making a greater profit for themselves. According to Service Manager Schleuter, the results can be very well summed up in the statement that previous to the piece-work schedule there were 104 mechanics working for a foreman. Under the new system, there is one foreman working for 104 mechanics.

The fundamental idea which was followed in installing the piece-work pay rate system in connection with the flat price rate was that, in order to have a sound foundation upon which to build a flat rate to the owner, it was necessary for the maintenance station to know itself exactly what the job was going to cost. In other words, the element of risk as far as the service station had to be removed if the thing was to prove a financial success. The only reasonable way for the service station to know exactly what the job was to cost was to put a flat piece rate upon the operation or series of operations. In this way the labor cost was known and the overhead could be added.

In order to work out a proper basis of time upon which to put the men, two expert time study men were borrowed from the factory and put on the job of determining exactly how long it should take to do each standard operation. Before these two men were at work very long, it became apparent that they would be overwhelmed with the details necessary in working out a schedule and the number of time study men was increased to ten. These ten men worked for 10 weeks before a flat time schedule was made up.

At the conclusion of this part of the work, the men were called into a meeting and the piece work method of payment explained and they were allowed to vote upon it. As a reasonable basis of compensation, sixty-five cents per hour was fixed as a standard rate. On this basis any job upon which the time study men estimated that 5 hour work was required, the man would be paid $3.25. If he got the work done in 3 hours he was paid the same amount, or if it took him 4 hours, he was paid the same amount.

Knowing that the time for the operations had been worked out on an honest basis by men from the factory fully competent to handle this work fairly, the men were practically unanimous in voting for the adoption of this system. It has worked out so that on the average, the men are making 25 per cent more than they did before. One man particularly, who was formerly paid 70 cents per hour, is now averaging about 90 cents per hour. This represents probably the maximum gain made, but all of the men find themselves making more money than they did under the old hourly rate.

From a cost keeping standpoint, the system is probably as simple as any which could be devised. With very few exceptions, the jobs can be put upon the flat rate system and the labor charge is immediately known from the time study. The overhead is added and is covered by the $1.25 an hr. rate for labor charged to customers in Detroit. In figuring the man's time, the number of the standard operations are put on his time slip, together with the number of hours required on the flat rate system. This is multiplied by 65 cents, the standard piece-work hourly rate to give the compensation for the job. On the slip is also stamped the time at which the man starts work and the time he quits. This immediately shows the length of time it required for him to do the work.

On the surface of it, it would appear that this method would be a temptation for the men to rush through the work and allow it to suffer, but this has been fully provided for in the arrangement that if any owner brings his car back within a week the man who did the work is required to do it over again without compensation. It is quite certain that if a man knows that if it is shown that the work he has done is defective and has to be done over again, he is going to be quite careful in handling the job. Furthermore, a poor mechanic is very apt to be soon weeded out by this system because, while the time studies are fair, they nevertheless represent good, quick, accurate workmanship and a man who is not first class will not be able to meet the schedule. Consequently, he will take a longer time than the time study, with the result that his compensation will drop off and he will be killed off automatically.

From the owner's standpoint, the system has a great many advantages. In the first place, it has the advantage of any flat rate system in that when a man drives his car in for repairs he can immediately be told what the bill will be when he comes back to get the car. He knows that the work is going to be good because the workman really must put a guarantee on each job. Furthermore, with this plan in operation in the shop, all of the jobs are so scheduled that it is quite feasible to promise an owner when his car will be ready and he is not apt to be disappointed by having to wait for a longer time than that indicated in the original promise.

Another big point which has been realized in the establishment of this system, particularly as it affects the contact between the owner and the service station, is that a considerable part of the success hinges upon the ability of the service station to properly diagnose the trouble and tell the owner exactly what will have to be done. When the owner brings his car into the service station, he is met by a service salesman to whom he tells what he wants done with the car. If it is not self-evident that what he says is exactly what is needed and if additional work is necessary to put the car into first-class condition, the service salesman goes over the car and probably drives it, accompanied by the owner, to reach any additional conclusions which may be necessary before writing the order. Based on the owner's recital and what he finds out for himself, the salesman fills in the order blank immediately, putting alongside of the work to be done the amount it will cost for labor. If he knows that parts will have to be replaced, he can also put down the names of the replacement parts and their prices.

At the Detroit service station, a charge of $1.25 an hr. is made for labor. If the operation is one for which, from the standard flat rate schedule, it is known that 3 hr. is required, the owner is charged $3.75 for labor and whatever materials are necessary to do the work. He can, therefore, in nine cases out of ten, be told quite definitely what his bill will be. After all of this has been entered on the order blank, the owner signs it, this amounting to a contract to purchase the work shown on the order and to pay the bill when the car is delivered, unless he happens to have a monthly account.

It is quite evident that with this system the service salesman must be highly competent to diagnose car trouble. In order to properly follow up the work, the service salesman in the Cadillac system is also responsible for it being done on

Sidelights On Cadillac's Piece Work Plan of Selling Maintenance

You cannot put in a flat rate system over night. It took 10 men 10 weeks to get a flat time schedule on maintenance work in the shop of the Cadillac Motor Car Co. of Detroit.

With the adoption of the piece work plan in this shop the men now get on an average of 25 per cent more pay and instead of 104 mechanics working for one foreman, one foreman now works for 104 mechanics.

The piece work plan puts every man on an equal basis. It automatically kills off the poor mechanic.

Working out a time schedule for each job makes it possible for the maintenance department to keep its promises on the delivery of customers' cars.

The flat rate system, together with the adoption of the piece work plan, in this Cadillac maintenance station has resulted in a 300 per cent increase of business—business which used to go to some other shop.

Under the piece work plan the men are paid 50 cents an hour when idle. This keeps up the shop morale; the men are not in a state of mind where they feel like looking around for another job and it keeps them instantly available for work.

time and for the fulfillment of the promise he has made the owner. He, therefore, keeps in touch with the shop by telephone from time to time to find out if the work is progressing according to schedule and then when it is finally delivered, as completed, he is required to ride the car again or to inspect it and finally O. K. the work.

If, on getting into the work, it is found that some additional repairs will have to be made besides what is shown on the original order, the mechanic reports this to the service salesman who took the order, and this man calls up the owner, getting from him an authorization for the additional work. At the time of the telephone conversation, the owner is told how much more the additional work will cost, so that he can add this to the amount already given him and he will be informed ahead of time as to what his total bill will be. He is also informed regarding the additional length of time it will take to do this work, so that he knows when he can call to get his car.

In the shop itself, there is an entirely different atmosphere than that which prevails in the typical hourly rate establishment. Anyone who has walked through a plant working on a piece-work system and through a plant on a similar line of work on an hourly rate will appreciate the difference. In the latter the work proceeds along rather leisurely lines, owing to the unfailing attitude of human nature to follow along the lines of least resistance, unless there is some driving motive. In the piece-work shop, the idea of added profits for added industry is quite sufficient to speed up the ambitious men to not only quicker but better work.

A very interesting phase that this has taken has been in the suggestions of the men for methods and tools for shortening the time required for a job. The Cadillac service station employs two tool makers, who are continually at work supplying the special tools and fittings to assist the men in repair work. Since the installation of the piece-work system, the number of suggestions offered by the mechanics to these tool makers for means and devices to shorten the time has been remarkable.

The Cadillac company does not cut the time allowance on account of these new methods, but permits the men to make the added profit due to their ingenuity. With an entire shopful of mechanics ever on the elert to discover quicker and easier methods of performing definite operations, it is not surprising that an amazing number of suggestions find their way into actual practice.

Provisions of all sorts have been made to keep the system as leak-proof as possible. One point which may arise is that for a short length of time the business might be slack and some of the mechanics have nothing to do. This has been provided for by establishing a flat hourly compensation of 50 cents per hr. minimum which the men are paid. If they have nothing to do their rate of compensation will automatically fall back to this amount of pay and in place of being sent home, a proceedings which always breeds more or less discontent, and leaves the mechanic in a frame of mind where he is probably going to spend a part of his time looking for another job. It keeps him contented and available for immediate use.

Another point which is provided for is that it is impossible for a workman to put in a requisition for a part which never gets on a car. The part itself is taken in against the new part which is issued for it. Thus, an owner can never be charged for a new part which is not put on his car, because the old part is always available for him to examine if he is not satisfied that the replacement was necessary.

To take care of the emergency night work which is apt to arise, one of the repair crews starts to work at 2 p. m. and works until 12 midnight. This crew is on regular production work the same as the men having the regular day hours, but by having these hours it is in a position to answer emergency calls, tow in vehicles which may become stranded on the road at night and to handle any other service requirements up to midnight. Very often a party of tourists is allowed to proceed along its way at night where it would be held up for practically an entire day if this system was not in effect.

To further promote the convenience of the car owner and to shorten the length of time it is necessary to tie up a car, a great many of the standard units, such as radiators, axle housings, and springs, which would require a long time to repair, are kept in stock. It is then possible to slip off the broken unit and replace it with a new one, permitting the shop to go ahead and make the repair at its leisure while the owner is not deprived of his car.

In order to maintain the feeling of absolute fairness which prevails in the shop, the foremen are very careful to balance up the jobs given to the different mechanics. It is quite evident that certain jobs will be easier than others with this system. That is, some particular job may require a great deal of effort and physical exertion in order to meet the time schedule set on the flat rate piece-work basis, while others may be handled so that the mechanic will finish in a proportionately quicker time and thereby make more money. The foremen balance these jobs up so that there can be no complaint of partiality, and in this way there is no chance for a feeling of discontent among the men who believe they are not being fairly dealt with.

The proof of the pudding is, of course, in the eating, and the object of all of these improvements in any service business is to increase the volume of business as well as the profits made. It may be interesting to note that since the flat rate system was installed in the Detroit district, the number of Cadillac cars actually registered in the district has increased by about 7 per cent, while the number of cars serviced through the Cadillac service station has increased by about 300 per cent. This indicates that the service station is now getting business which used to go elsewhere.

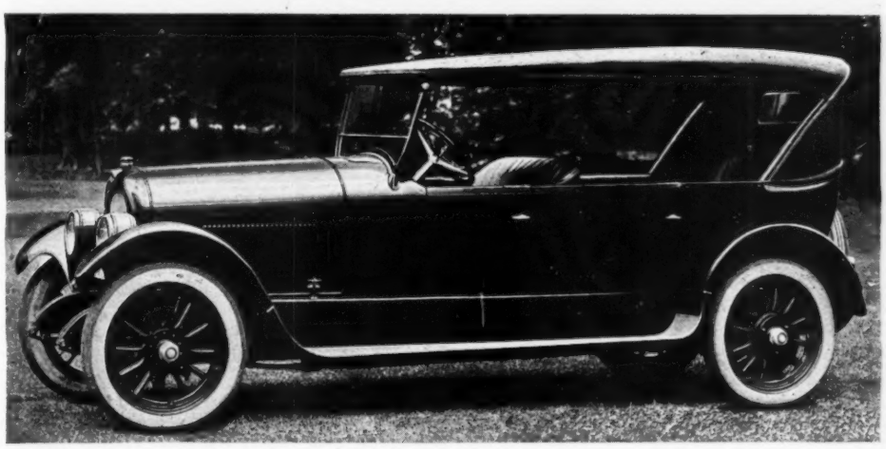
By putting in good wash racks, which do exceptionally fine washing jobs, and by providing the owner with conveniences which he is not apt to find in the miscellaneous garage, the business of this service station has grown rapidly and from all indications will continue to grow as a result of the installation of this system.

New Marmon Phaeton

A slight lowering of the hood, straightening of the lines from front to rear, a lowering of the overall height of the car by 4 in. and the Panorama top are characteristics of the new Marmon seven-passenger phaeton.

The latter is a stationary top, braced at the corners, but retaining in every way the light weight and flexibility of the ordinary one-man top. The absence of the usual supporting bows brings to the passenger an unobstructed view.

The lengthening of the body, together with a lowering of the front and rear seats, have materially increased the roominess and comfort.



New Series Cole Eight-Ninety Embodies Important Structural Changes

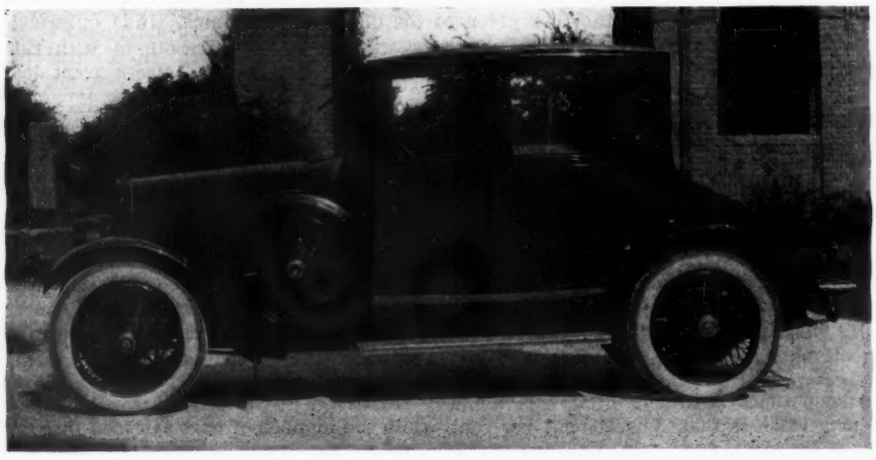
Strong Frame, Etruscan Body and Improved Carburetion Are Features

FOUR important features of the new series Cole Eight Ninety are the frame, Etruscan body, hydro-cushion spring action and the envelope manifold.

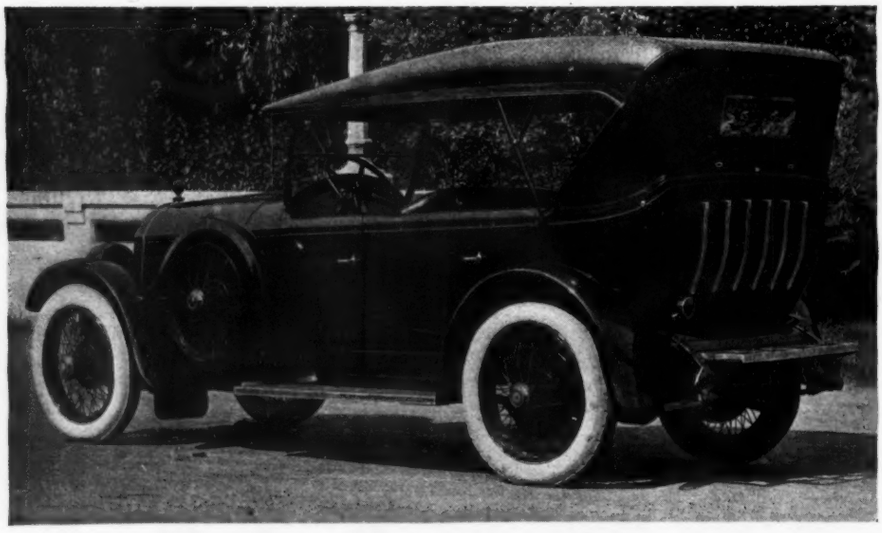
The frame is made of pressed steel 6 in. deep and 2½ in. wide with five cross members and two tie bars. On the rear cross member there is a heavy gusset plate which increases the rigidity. The word Ultramite, meaning "very strong metal" has been adopted as descriptive of this new frame.

The new Etruscan body is designed on the basic principles of the art and architecture of Etruria. The wheelbase remains at 127¼ in. but the body has the appearance of being lower, due partially to the black rounded molding at the lower edge of the bevel at the top of the body line. This molding extends from the radiator the full length of the car. Running parallel with the molding, about 1 in. below, is a thin white line which gives an additional touch of harmony and grace. The standard color is a rich Cole blue with black sheet metal parts and chassis.

There is a ventilator in the cowl which gives a circulation of air into the driver's compartment. New drum headlights, 12 in. in diameter, with hand ground fluted lenses and adjustable lamp brackets and tie tube add to the beauty of the car. The lamps and brackets are black enameled and mounted to the fenders by heavy tie bar which serves as a fender brace and lamp support and prevents rattling or weaving.



Some important features of the new series Cole Eight Ninety are the frame, Etruscan body hydro-cushion spring action and the envelope manifold



Individual steps have been eliminated on all models and in their place are full three-quarter running boards, made entirely of aluminum and covered with a rubber mat

On all models the spare wheels and tires are mounted on the sides. Cole maintains that this scientific distribution of weight helps to secure balance. When one considers that a disteel wheel and tire weigh about 125 lbs., it is easy to understand the influence a total of 250 lbs. would have. In placing this weight nearer the car's center of gravity the liability of skidding is greatly decreased.

The individual steps have been entirely eliminated. In their place is a full three quarter running board made entirely of aluminum covered with a rubber mat. It is mounted directly to the frame and rear fender in such a way that it forms a strong support to the fender. The fenders, aside from the change of design to harmonize with the Etruscan body, are twice as thick as formerly used.

With the exception of the Envelope Manifold, improved oiling system and a few minor changes, the engine remains unchanged. The new Envelope Manifold uses the exhaust to assist in the volatilization of the gas. This is done by completely surrounding the intake manifold with the exhaust manifold. It is found that with this new manifold construction the engine operates much more smoothly and more economically.

The hydro-cushion spring action is a Cole development which has greatly increased the riding quality by the scientific coordination of the spring action with positive, hydraulic rebound absorption. Lovejoy hydraulic shock absorbers are standard equipment on all Cole models. The springs are of the semi-elliptic type, 57½ in. in rear and 39 in. in front. These have been lengthened over last year's models and made lighter to get greater flexibility. Rubber spring bumpers are provided in both front and rear to prevent any metal clashes on extreme rebound. These bumpers are made of tough, hard rubber and are mounted to the frame.

A new type "M" Gemmer steering gear with an all wood walnut steering wheel and friction type control has been adoptstruction throughout with more bearing on the steering arm shaft, permitting easier steering. The wheel is 18 inches in diameter, and made of laminated walnut with finger grips on the inside and hand grips on the outer surface.
ed. This type is much heavier con-

The trunk rack and body guard rails are made of aluminum and carry out the idea of the Etruscan design. These are substantial looking and add very much to the appearance of the car. The trunk rack is anchored direct to the frame and serves as an additional support, which increases the rigidity. The windshield has been made rain proof by completely sealing the stationary lower section with rubber strips.

By actual count there is a total of eighty-one improvements and refinements on this new series which is offered in the following body types:

Roadster, $2685; Tourster, $2685; Sportster, $2685; 2 Passenger Coupe, $2885; Four Passenger Coupe, $3385; Toursedan, $2985; Suburban, $3685; Sedan, $3685; and Berline, $3885 — all models are ultra equipped.

Commerce Motor Coach Incorporates Novel Features

Speaking Tube to Rear of Bus Warns Driver of Approaching Vehicles. Comfort to Passengers Given Attention

The chassis of the Commerce Motor Coach, built by the Commerce Motor Car Co., Detroit, is designed especially for passenger transportation and equipped with the Model 6-T—six cylinder Continental engine. The wheelbase is 198 in. and the body is supported by eight flanges, placed on the frame at the points of greatest stress. Special spring suspention with the long 60 in. rear springs, give the desired flexibility and easy riding qualities.

Timken axles are used front and rear —Brown Lipe six plate multiple disc clutch, Brown Lipe amidship transmission with four speeds forward and one reverse, direct drive in fourth. Two types of wheels are optional, the wood artillery type, using 36 by 6 cord fronts and 40 by 8 cord rear tires and the Michelin steel disc wheels all around, using 36 by 6 tires with dual pneumatic rears.

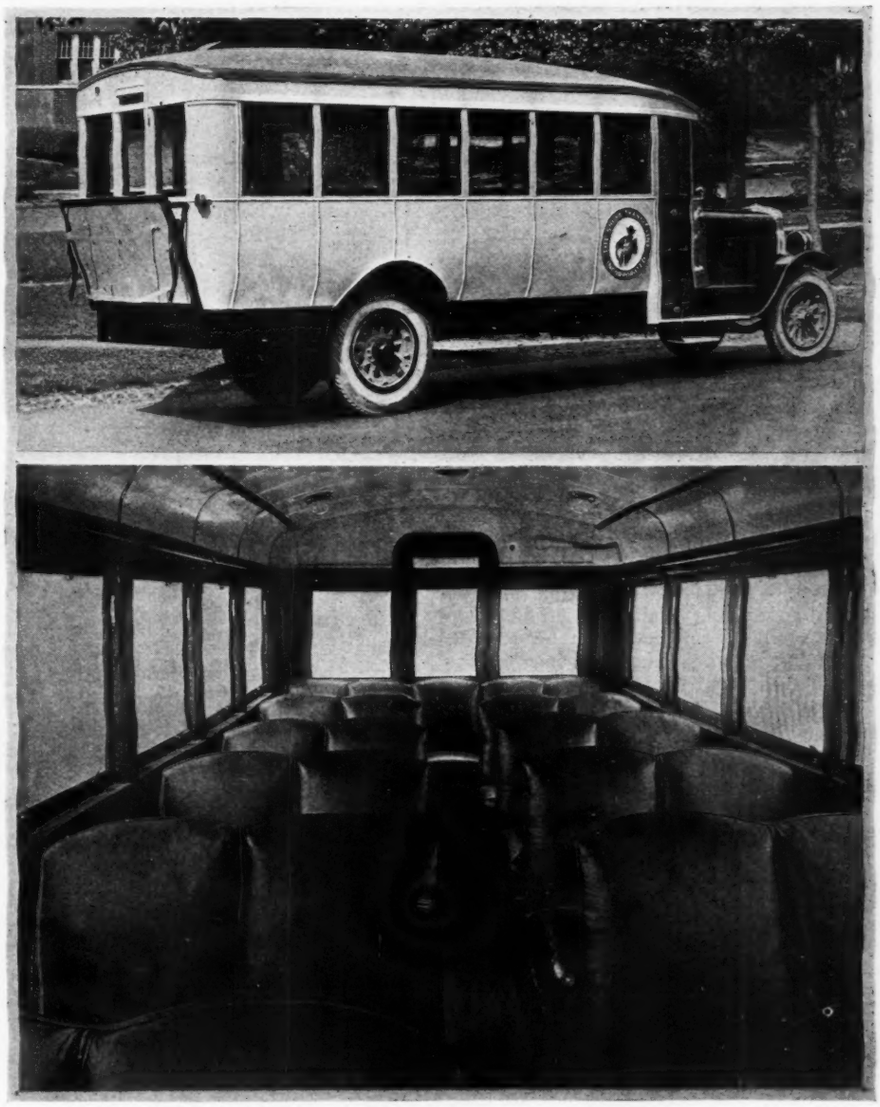
The chassis is built with the idea of giving performance, having the necessary strength to endure the gruelling tests caused by the numerous stops necessary in passenger transportation, at the same time, rendering speed necessary for quick service.

In appearance the complete bus is striking. Baggage compartments are conveniently arranged on both sides and in the rear, the copious luggage carrier accomodates all the personal baggage necessary in interurban travel. The body is painted in Battleship gray, a color which is durable and cleans up well. Parking lights and "stop" lights, besides the drum type head lights on the chassis, are also part of the exterior equipment. The inside of the coach is made comfortable to passengers.

First of all, there are individual seats, upholstered in Spanish leather, with ample knee room. The coach is well lighted by six large dome lights in the center and the windows are all equipped with roller shades, so as to control the light in the day-time. Complete electric buzzer system is installed, as well as electric heaters which run around the entire length of the coach inside. This insures warmth in cold weather.

One of the features of the bus, is the speaking tube which runs from the exterior of the rear to the interior front, by the driver's seat. This is a safety device, so that the driver of the coach can hear all approaching noises from the rear, including horns of other automobiles desiring to pass. This device will be especially appreciated by the driver.

The ventilating "V" type windshield is a practical arrangement. The coach is equipped with roof ventilators, as well as dash ventilators in the front and with convenient stop light, rendering safety to passengers alighting and entering the coach.



A feature of the Commerce Motor Coach is the tube which runs from the rear of the car to the driver's seat, making it possible for the driver to hear all sounds of danger in the rear

New Case Model W Announced to Replace Old Model V

Wheelbase of New Model Is 129 Ins. Continental Six-Cylinder Model 6T Engine, Developing 70 Hp. at 2400 Crankshaft Revolutions, Powers the Car

Simultaneous with the announcement of the discontinuance of the model V, the J. I. Case Threshing Machine Co. have made announcement of a new car which will replace the discontinued model V, and will be known as the model W. The new car is of slightly larger all around dimensions than its predecessor and follows conventional designing practice in the chassis units. A creditable road performance has been secured by careful weight distribution and it is claimed that 44 per cent of the total weight is on the front wheels and 56 per cent on the rear.

The wheel base is 129 inches and the car is carried on wood wheels, using twelve 1½ in. spokes with Firestone rims on which are mounted 34x4½ in. Goodyear cord tires. Front axle is of standard "I" beam type made by Columbia. Ball thrust bearings are mounted at the upper end of spindle at the king pin to reduce the effort required for steering. The tapered roller bearings on each spindle carry the front wheels.

Torque reaction at the rear axle is counteracted by a tubular arm of Case design, the rear axle proper being of Columbia make. Axle drive shafts are 1 7/16 in. in diameter, of nickle steel, with Iospline fittings. The standard gear ratio for the open models is 4 5/11 to 1 and 4⅞ to 1 for the closed cars.

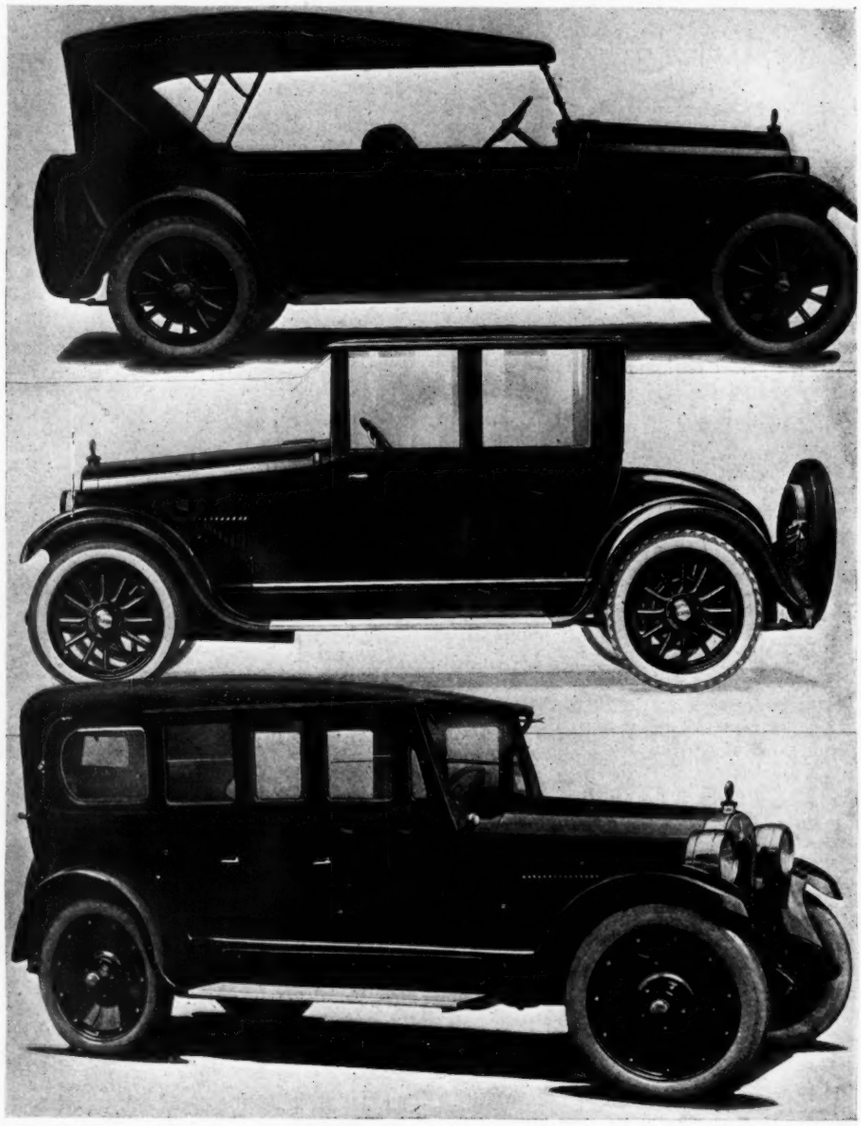
Brake drums of 16 in. diameter and 2½ in. face provide one square in. of brake surface for each 8½ lbs of car weight. The service brake pedal actuates the external contracting band, while the emergency handle is connected to the internal expanding shoe. Bound Brook oiless bronze bearings for the brake cross shaft assembly. The frame, built in the Case shops, has straight side rails of 6"x2"x5/32" section. Four channel cross members render the necessary rigidity in addition to which there is mounted at the rear the usual tubular cross support.

The springs, which are manufactured by the Harvey Spring Co., are made up of thirteen thin plates or leaves. The main plates are of alloy steel, the length from center to center of eye of the front spring is 40 in., width of plates 2 in. Rear springs measure 56½x2½ in. Snubbers are furnished as regular equipment.

Power is furnished by the Continental six cylinder model 6T engine of 3⅝ in. bore and 5¼ in. stroke, which develops 70 h.p. at 2400 crankshaft revolutions. The L head cylinders are cast en bloc, the cylinder head, block, crankcase, flywheel housing and oil pan are separately cast detachable units. The crankcase is of cast aluminum and is removable for access to the bearings. Pistons and rods can be removed from the engine without removing the cylinder head, sufficient room being allowed to permit their withdrawal past the crankshaft.

Pistons are of cast iron fitted with three rings and oil grooves and are similar to the regular Continental design. Piston pins are anchored in the piston bosses by a special locking device. A 1⅛x1¾ bronze bushing, led through a hole in the upper end of rod, is pressed into the rod and provides a bearing for the piston pin.

The four bearing crankshaft is of the inherently balanced type carried on main bearing bushings of 2⅜ in. diameter. The four bearings have a total length of 9 1/32 in. End play in the crankshaft bearings can be taken up by adjusting thrust washers at the front bearing.



Upper—The Case six passenger phaeton. Middle—The four passenger coupe —Lower—The Badger all season top applied to one of the open models

The camshaft and auxiliary shaft drive is through Morse silent chain with adjustment to compensate for wear in the chain without removing the gear case cover. The gear pump, which is separately attached to the engine, supplies oil under pressure to the main and connecting rod bearings through the drilled crankshaft.

A 1½ in. Rayfield water jacketed carbureter is connected to the hot spot manifold and fuel is supplied to the carbureter by the Stewart-Warner vacuum tank from the 18 gal. capacity tank mounted at the rear.

Circulation of the cooling water is accomplished by means of a centrifugal pump, driven from the auxiliary shaft. Radiation is provided by a tube and fin type of Case made radiator, which is flexibly mounted. A Rayfield automatic thermostat regulates the temperature of the cooling water. Ignition, starting and lighting are furnished by a two unit Delco system, using a Willard battery and third brush generator regulation.

The clutch and transmission, which are part of the unit power plant, are both of Case manufacture. The disc clutch is similar to the clutch used on earlier Case models. Friction area is provided by nine gear type plated which are faced with a non-burnable material. The clutch pedal is adjustable.

The transmission is conventional in every respect except that the gear shifting forks move on shafts permitting an oil tight case. Gears and shafts, which are of nickel steel, are ground after hardening. Timken roller bearings are used throughout the transmission, which has its connection to the rear axle through two Arvac, centered type, fabric and rubber disc, universal joints on a tubular propeller shaft.

Chassis lubrication is by Alemite, applied at 32 points, no grease cups being used.

The model "W" chassis is furnished with four body types, phaeton, sport model, coupe and sedan. All bodies are anchored to ten brackets and malleable braces are used throughout to reinforce the ash frame work. When wood frame is completed, prior to applying metal, it is given a coat of linseed oil and primed to prevent deterioration and squeaks. Upholstery is long grain dull finish black leather and cushions have eight in. springs.

The usual layout of instruments is carried on the mahogany instrument board, Jorgenson primer and ventilator control being part of the layout. The swivel mounted drum type headlights are adjustable to any angle and are equipped with a two bulb type of dimmer. A combination stop and tail light is furnished as regular equipment. Copper and nickel plated screws and nuts are used throughout the construction of the two piece windshield.

The weight of the phaeton is 3640 lbs., the sedan 3900 lbs., the sport model 3510 lbs. and the coupe 3750 lbs. The prices for the different models in the order named are $2250, $3250, $2250 and $2885, f.o.b. Racine. A Badger all season top is furnished at the factory for $260 additional. A mileage performance of 17 miles per measured gallon and a speed range of from 2 to 70 miles per hour in high gear is claimed as a result of the experimental tests.

Kissel Announces New Coach Limited

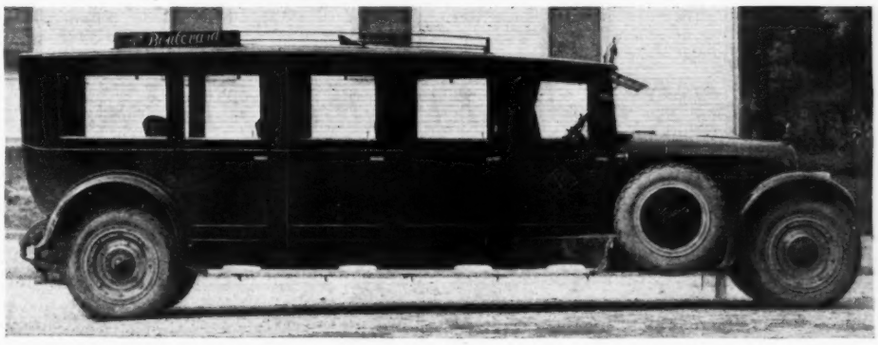
Duplicates Sedan Comforts in 18 Passenger Coach Body

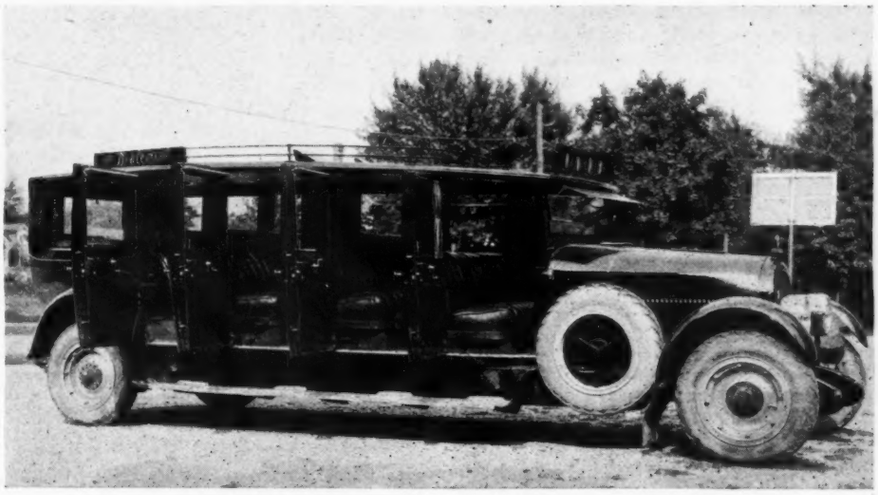
WHAT promises to establish a new standard of riding comforts and pleasures in motor bus transportation and at the same time create a new type of bus chassis and body design, construction and finish, is announced by the Kissel Motor Car Company, Hartford, Wis. An inspection of the new Kissel Coach Limited, reveals the fact that Kissel has gotten away from the customary bus design, and has produced a vehicle that embodies operating smoothness and roadability quietness of the sedan.

Kissel has ignored the usual practice of employing a heavy chassis and engine of truck-like proportions and employs a specially designed chassis practically the same as that of the passenger car chassis, with of course, those necessary additions to take care of increased wheel base of 202 in. and the weight of a body, of 18 passenger capacity.

The coach body is built entirely in the Kissel shops. It is hand made throughout with all sills, frames and body pillar connections specially designed, constructed and braced with angle irons that permit no body spreading or squeaking, to develop. All lumber used is prepared northern ash covered with 14 gage aluminum.

Entrance is made on the right hand side through four doors, each door opening directly into a seat of full sedan width and depth, with plenty of leg room for passengers' comfort. The seats and backs are shaped and built to conform





Above—The Kissel Coach Limited has a wheelbase of 202 ins. and is 18 passenger capacity. Entrance is made on the right through four doors, each door opening directly into a seat of full sedan type with plenty of leg room for passenger comfort

Below—The interior of the Kissel Coach Limited with the full sedan type seats and the four doors. A 61 hp. Kissel engine powers the coach at 35 mi. an hour

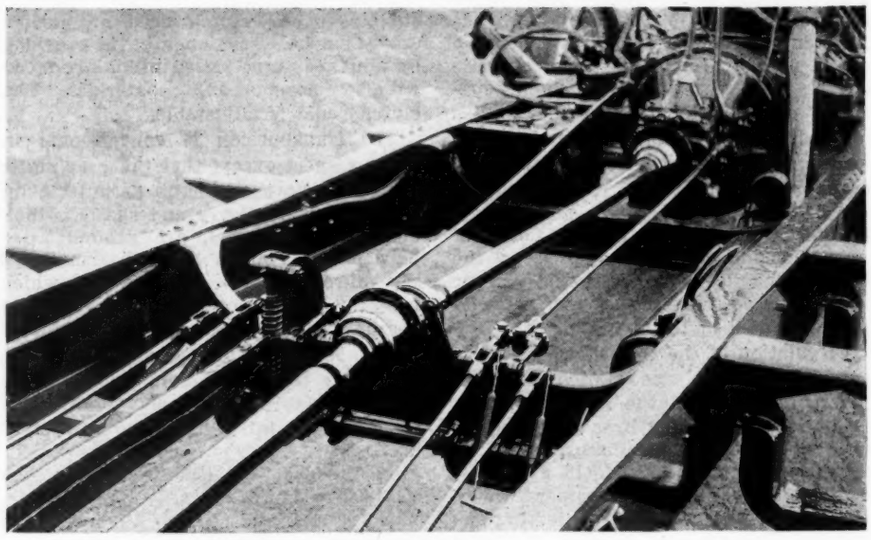
to the most comfortable sitting and riding position and are upholstered in Spanish leather. The seat backs are 24 in. high and are equipped with slumber rolls for added comfort.

All four doors are automatically locked when closed and can be opened only after the driver releases the catches by operating a lever.

Particular attention has been given to the health and comfort of passengers. Ventilation without drafts is attained by four roof ventilators installed in the roof, two in front and two in the rear, easy to open and close. Also ten large windows can be lowered, in addition to the windshield. The lighting system is composed of eight dome lights flooding the interior with an indirect light that is easy on the eyes, and permits reading with comfort.

For cold weather travel, proper temperature is assured from four Perfection heaters, so located that it is impossible for the interior to be heated in spots.

To give the Coach Limited roadability, Kissel employs a 43 in. frame exactly the same in design as the regular Kissel frame with a kick up for low body design and allows distribution of weight necessary to enable the Coach Limited to hug the road without any side sway or skidding. The Coach Limited is only 3 in. higher, in over-all height, than the regular Coach Sedan.



The Kissel Coach Limited frame which is 43 in. wide with 8 in. side rails of one-quarter gage and equipped with five cross bars

The bus frame is 43 in. wide with 8 in. side rails of ¼ gage and equipped with five cross bars. This frame was determined as to resiliency and strength at minimum weight. To assure maximum spring flexibility semi-elliptic alloy steel springs are used in front, 38x2½ in. and 60x2½ in. in the rear. Both springs are equipped with Kissel side play adjustments to eliminate rattles or squeaks. Specially designed front and rear axles are used while the brakes possess special braking surface to produce the greatest braking efficiency.

A 61 H. P. Kissel Custom-Built engine powers the Coach Limited at 35 miles per hour.

Crawford Producing Dagmar Sport Model

Features Custom Built Body with Victoria Top

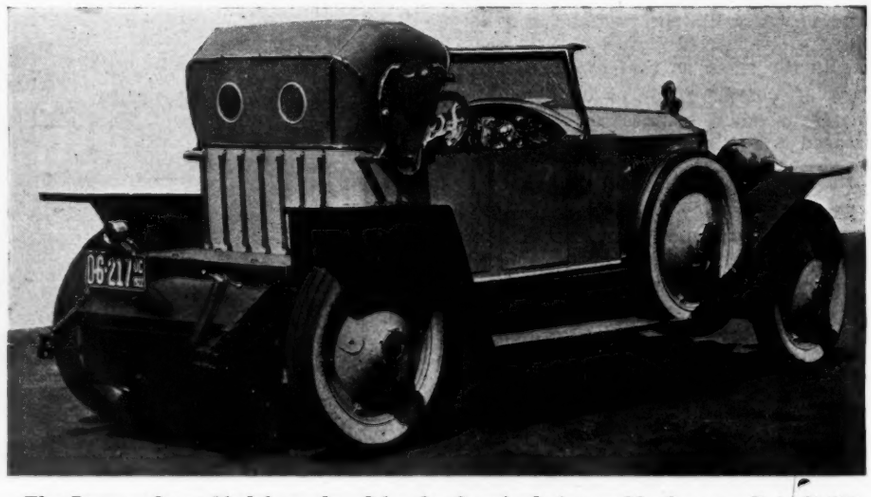
The Crawford Automobile Co. of Hagerstown, Md., is now in production on a sport model to be sold under the name Dagmar. This is mounted on a 135 in. wheelbase chassis and is characterized chiefly by a special sport type of body, of the custom built type fitted with Victoria top and seating four passengers. The car has a high narrow radiator, two spare wheels mounted on each side of the hood and fenders with straight lines and sharp angles, giving a distinctive appearance.

The component parts of the chassis include a model G-T 3⅝x5¾ in. Continental engine with chain drive, Zenith carbureter, Westinghouse starter, American Bosch lighting generator and magneto ignition. The gearset is a four-speed Brown-Lipe unit driving direct on third, and over geared on fourth. Front and rear axles are of Timken manufacture. The rear springs are 53 in. long and the rear springs 36 in. Spicer universal joints and Brown-Lipe multiple disk clutch are employed.

The wheels are artillery type wood but are covered with dummy plates, giving the appearance of disk wheels. The engine is mounted on a three point support with the rear supporting arms fastened to the frame by bolts screwed up against a helical spring.

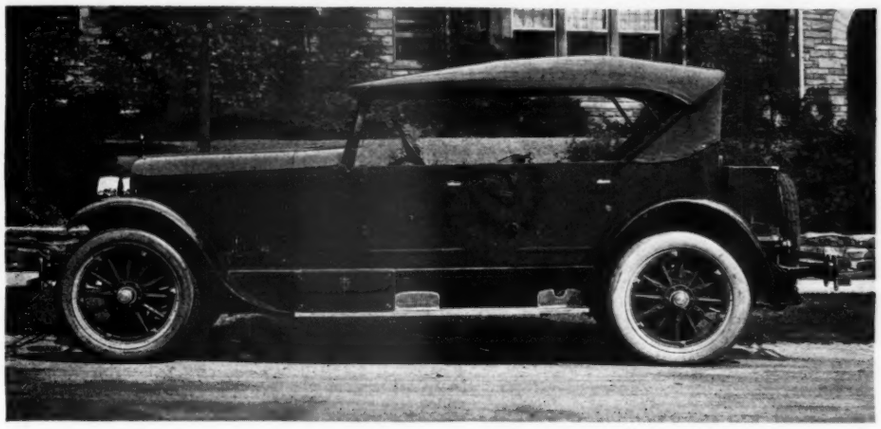
Equipment includes six 33x5 in. cord tires, 35 gal. gasoline tank mounted at the rear of the chassis, Stewart-Warner vacuum tank, Willard battery, one-piece windshield, Hartford shock absorbers, Gas-O-Meter, clock, drum type head lamps, Moto-Meter and cigar lighter. Body colors are optional, while metal trimming is all of brass. Price of the car is $3500 f.o.b. Hagerstown.

The body is provided with a narrow flat deck for a trunk at the rear. Vertical body cleats of brass protect the rear body panel.



The Dagmar Sport Model, produced by the Crawford Automoble Co. to sell at $3,500 f. o. b. Hagerstown, Md. It is mounted on a 135 in. wheelbase chassis. Equipment includes six 33 by 5 cord tires, 35 gal. gasoline tank and many extras. Body colors are optional, metal trimmings are all of brass

Jordan Blue Boy, a New Four Passenger



A new four passenger model which was entered on the production boards of the Jordan Co. in August. It is known as the Jordan Blue Boy and is a new car from headlight to rear bumper

THE Blue Boy in Blue Devil Blue is Jordan four-passenger car, which the characteristic name of a new went into production during August.

In reality, it is a new car from headlight to rear bumper. The wheel base has been lengthened to 124½ in. for sporty lowness. The car rides close to the ground and the cushions hug the floor.

The general shape of the body is the same as the Play Boy as far back as the front seat. A slight curve has been added to the back of the front seat. The rear of the body is low and does not have the sweeping curve on the back panel that is found in the phaeton. The sides of the body are ¾ in. lower than the phaeton body and because of the extra 4½ in. added to the wheel base a liberal door opening is provided. Upholstery is in dark blue morocco leather, put on without plaits. A roll is incorporated at the front edge of the cushions furnishing a support for the knees.

Seat cushions are very low, being set right on the floor with just enough pitch to make them unusually comfortable. Long curled hair and Marshall cushion and back spring add to their riding qualities. A heavy strap of tan leather with a distinctive nickel-plated brass buckle, and heavy polished aluminum end brackets serves as a robe strap and adds greatly to the appearance of the interior. There is a wool carpet on the tonneau floor. The foot rest is brass, nickel-plated.

Running boards are covered with black ribbed rubber instead of the conventional linoleum and there are aluminum kick plates to protect the running board filler.

The top is of the Golde type with a polished rust proof frame and natural wood finished bows. Top material is imported Burbank. Burbank side curtains and slip cover are standard equipment. Curtains and curtain rods are stored in the right front and rear doors, leaving the left rear door free for carrying odds and ends. The top is 2½ in. lower at the sides and 4 in. lower at the rear. Tires are 32 by 4½, cords. The windshield is silvering quality, plate glass, of one piece construction like that used on the Jordan Play Boy.

There is a new type steering wheel with walnut spokes. Small spark and throttle control are mounted in a small space at the center of the wheel without the conventional aluminum sector.

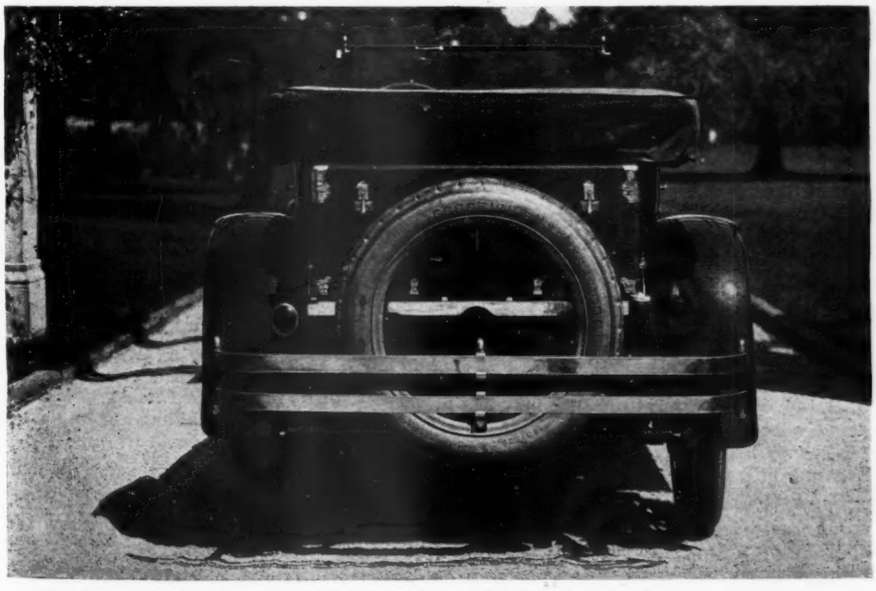
There is a trunk rack on the rear with a rubber covered platform, and polished cast aluminum bars with blackened grooves. Additional aluminum bars to match are fastened on the back panel.

The trunk itself, which is furnished as standard equipment, is covered with black Fabricoir with locks and corner tips if brass, nickel-plated. This trunk contains two good sized suit cases with an additional space at the end to carry golf shoes, packages or other articles.

Small tools are carried in the left hand front door and the larger tools are stored in a box mounted on the left hand running board.

Head lights are all brass nickel-plated and are of the new barrel type design. Bumpers are standard equipment front and rear, and there is nickel-plated windshield cleaner.

The Blue Boy is listed at $2150 f. o. b. Cleveland.



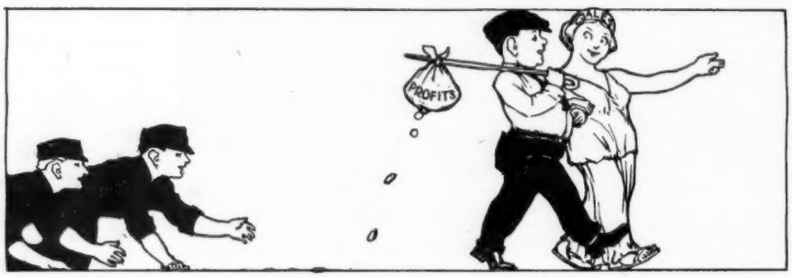
A rear view of the Jordan Blue Boy showing trunk compartment. The wheelbase of this new model has been lengthened to 124½ ins.

The driver's seat. Small tools are carried in the left hand front door. A combination clock, speedometer, ammeter, oil gage are on the instrument board

The Fable *of the* Hard Hitter Who Nearly Fanned Out

By TOM WILDER

With Apologies to George Ade



ONCE there was a Dealer named Bill who seemed to be in business for his health and pleasure only. Bill had another name but no one ever used it on him, so we will forget it. He was the proverbial Hail Fellow, Glad Hander, Booster and Good Sport, all in one. He enjoyed the game and played it mostly for the fun there was in it, but figured to get enough out for a good living for himself and his men.

He enjoyed a good business because he was a favorite with the Motor Bugs of the more liberal class, handled two generally liked standard cars and just about dominated the field in his vicinity. Sales of new cars were his Hobby and it was as a salesman that he scored Strong.

Whenever one of his Friends (His customers were all his friends) complained that his Bus was On the Blink it was Bill's cue to sell him a new one. He never thought of selling Service, because his shop was a necessity rather than an asset. Controversies over repair bills were so common and settlements at a loss so numerous that Bill preferred the clean "Take it at the Price or leave it" method of doing business to anything in the line of service. He could sell a new car to a man, take in the old one in trade, give it a good cleaning, a coat of varnish, tune it up a little and sell it at a good profit; but the whole transaction was based on sales. What little part the Service shop played was in service to him not to the customer.

In this way he kept the good will of customers both for the old car and the new. If the man who bought the old car came back and complained he made good with his service or if the job was too big used his sales ability to sell him a new car or a better old one.

Service he considered merely an expense item to sales and no particular account was kept of it. He knew he could always get his Service expense back on the resale so the shop men got into easy going habits and when time was turned in on an outside service job the customer usually made a howl.

Bill's Policy was to keep everybody happy for the minute he tried to deal out parcels of service he was Up to his Ears in Grief. So long as he stuck to actual articles of Merchandise it was Beautiful Weather but when he tried to deal in intangible things Squalls were frequent. He could sell an antiquated old Chariot with a 10 dollar coat of Varnish at a profit of 50 Beans but it was difficult to get 50 out of a 75 dollar overhauling job.

As the Territory became more thickly populated with cars, however, the problem of disposing of old ones became increasingly greater. Bill's Cars too, began to get a Rep. for being short lived and his Competitors pointed with glee to the fact that, whereas Bill's cars were taken in on trade for new ones every year, their own customers were running the same cars, with slight adjustments for several seasons. Some of them went so far as to make a definite schedule of cost on their cars showing at what mileage parts and wearing surfaces must be renewed to keep up performance and compared the cost of these renewals with the greater costs of new cars. It took a considerable exercise of Bill's salesmanship to combat these facts especially when some of his old customers who had several new cars in as many seasons compared their mileage cost with that of some Bird who perhaps had a more expensive car but had run it continuously for the same length of time.

The War Tax also Kicked Bill for a Goal making trade-in sales that much more expensive to the customer so that all things considered he was Hoeing a much more Up Hill Row than ever before.

About this time in the course of our Narrative a Youngster Named Alfred came to work as bookkeeper in Bill's organization. While Al was young, he was thoughtful and had an investigating turn of mind which had been developed to some extent by his work on a former job where he was assistant to an expert accountant.

The first thing Al noticed after landing on the new job was the surprising lack of profits. He had always supposed that being engaged in selling Cars was synonymous with Soft Picking and Easy Money. So when he began to find expenses of all kinds gnawing the profits away until little remained he was, to say the least, surprirsed.

There were sales expenses, dinners and entertainment, carfare, railroad, hotel, gasoline and all the regular things that one expects to find. But this big shop payroll—all going out and little coming in. Why was it necessary? If cars were imperfect when sold why should not the manufacturer Make Good, but if the owner was careless why should not he be charged for the repairs? Why must the dealer stand these expenses?

He also found a surprising lack of interest in the Dead Head jobs in the shop. No time was charged against them so there was never a question of the cost. If the men were busy the jobs went through on Greased Skids, but if there was little work in sight it was an all day job to tighten a rear wheel. There was always enough of this work to ruin any chance the shop had of showing a profit, so the shop foreman lost all interest in cost. He kept enough men to do the work well. They hurried some when the shop was full but mostly they loafed a lot because it was seldom full.

Al was wise enough to know that this was the Boss's pet way of doing business and that any interference on his part would be considered affrontery and result in being Pushed off the Pay Wagon. So he dug up the records on certain cars from the time they were sold down to date. He had no record of costs but he did have a record of the repairs made and supplied the costs from records of costs on similar jobs done at owner's expense.

He also compiled reports of shop receipts and expenditures showing the amount of work charged for and the items and the amount of work not charged for with the items. From the bulk of the uncharged work he made rough estimates of the cost of this work keeping proportions about the same as on the charged work.

One report showed that a car sold to a man who almost immediately left town was the only one ever sold on which the full profit was realized.

Another report showed that A Good Customer had received so much atten-

If there was no work in sight, it was an all day's job to tighten a rear wheel

tion that the sale had actually resulted in a loss.

Al had enough Evidence to Convict the Blooming Organization but since the Boss was Judge and Jury and principal Defendant it was a Ticklish Case to Try so he Sat Tight and watched his chance to Fix the Jurors.

It wasn't long before Opportunity Knocked and Al Opened the Door in a hurry.

The Star Salesman had Hit the Boss for a Raise in commission, claiming his share was not a Living Wage. Bill tried to show him that while the normal commission on a car was 20 per cent, the salesman's commission and overhead reduced it till there was little left but a Shadow; advancing the commission would be Business Suicide.

To settle the dispute and get some tangible facts they asked Al to prepare a report on sales and profits that would cover the question.

Al Doped Out the report all right, and while the Boss wished it to be unfavorable he was almost Floored at the actual result and began to wonder why he was in business anyway. Along with the report Al slipped in a few of the individual car reports choosing some which Showed Up the salesman and some which Showed Up the Boss at his worst. He wanted to prolong the argument and make it lead, if possible, to a general Clean Up and put him in charge of the installation of a good accounting system that would Show Up the Leaks.

There was a wild scramble between the two for the honor of making the most profitable sales and Bill had to acknowledge his defeat until Al produced some more that reversed the decision; then the Salesman Ran true to Form and tried to Put the Bee on the Service Department which was the Bear Trap Al had Set. The shop foreman was Called on the Carpet and asked to explain why the Company's service cost so much more than service to the Customer. He passed the Bee on the bookkeeper, claiming that there was no charge on company service, that it was done on spare time when the men could otherwise earn nothing.

Al come back with the Bluff that if the shop could not show a profit it should be abolished and the Free service either Farmed Out or done by one good man and an assistant who could make themselves useful in other departments when not busy on repairs.

So they Passed the Buck Forward and Kicked it Back until Bill wondered if he was a Business Man or just a plain Boob. The more he wondered the Madder he got.

After he had cooled down and talked over the proposition with Al, he called a conference of the Whole Works and said several Mouthfulls.

"This Concern," he began, "up to now has been headed for the Beach with All Sails Set and a Jokin' Fool at the Stick. It has always been my Policy to Keep Everybody Happy, believing profits would take care of themselves. I still Stand Pat on the Policy but there are a certain number of Hogs for Happiness infesting these parts that must be led to the Slaughter for they seem to have been soaking Up all the profits.

"Starting today, the Gentlemen including Myself who Shoot the Hot Air and Rope the Prospects while they are Eating Free Service out of our hands are going to Sail a New Course, for from now on there aint going to be No Free Service; Cars must be sold on their merit, Imperfections will be made good, of course, but that's all.

"The Gentlemen of the Shop too are about to start on a new Voyage. Instead of working to make the Sales department, the Customer, and themselves happy at the company's expense their one aim from now on is Profits.

"In the Past it appears, our shop has existed to give Free Service but its future is in competition with the Alley Repairman. It will be reorganized to Sell Service at reasonable prices on a Cash basis. There will be no Favorite Customers, no tips and every mechanic will have a chance to Get Next to a Rep. as a Profit Purloiner with a pay envelope in proportion."

Bill went on down the line with never a department slighted and in conclusion said, "Most of us have been Pulling in the same harness for quite some years but I guess we haven't pulled together very well for in spite of selling popular Cars and More of them than anyone else in town our earnings are hardly enough to meet our expenses.

"From now on those who do not pull With the Bunch and For the Bunch will be asked to Pull Out. Every man's job is just as good as he makes it and it's going to be my new job to Sell Service and Make it Pay.

"Shop profits are going to be just as important hereafter as Car or Accessory or Parts Profits and there is no reason why, with this Big Idea in mind we cannot all increase our earning power. Salesmen will find it harder selling cars than giving them away and their commissions will possible need adjusting along with other changes but if we all pull together for the Company and for each other we are bound to win."

Bill was the busiest man in town, the Early Bird had nothing on him. True to his word he started selling Service and was on hand every morning to meet the Gentlemen who stopped for their Free Service on their way to business. It required a diplomat to tell these people Where They Got Off and still hold their trade and Bill showed his wisdom in tackling the job himself. Later, when the new methods had become established he could turn the duties over to another and go back to selling cars. Just now, however, it made such a hit with the customers to find the Pres. clothed in a linen duster Shooting Trouble that it almost compensated for having to pay for what they thought they would get for nothing. Bill also proved his salesmanship by selling complete overhauling jobs to Customers who thought they wanted free carbureter adjustment; he never missed a chance to look a car over thoroughly and make suggestions to the owner many of which were accepted.

The shop foreman and two of his favorites were Peeved at the new course and quit without notice but Bill had already Picked their successors and was just waiting for them to find out they were Fired.

Al was rewarded by being made Financial Director and Confidential Aid to the Pres. with quite a sizable salary. So with Shop Leaks stopped and Shop Profits assured, new car sales were pretty near all velvet and the concern was exceedingly prosperous.

Moral—A good salesman often needs a Nurse.

It made a hit with the customers to find the Pres., clothed in a linen duster, Shooting Trouble

122 Cu. In. Racing Engine Still Greatly in Need of Development

Increased Crankshaft Speed, Lighter Reciprocating Parts and Lubrication Are Chief Factors Affecting Design

Now that the French Grand Prix and the fuel economy run are history, it is interesting to reflect a moment and see what sort of an account the 122 cu. in. engine gave of itself in these events. The cars for next year's Indianapolis race are restricted to the 122-in, class and probably some of the same problems which the European contestants had to face will manifest themselves to our American builders who are building engines for the 500-mile race next year.

Generally speaking, the problems involved in the design and construction of the 112-in. engine are very much the same as with the 183-in. engine, namely, to get increased crankshaft speed and a reduction in the weight of reciprorating parts. The problems become apparent when it is realized the small engine must turn over between four and five thousand r. p. m.

With increase in engine revolution, the problems of carburetion, valve layout, cooling and lubrication increase proportionately. The results of the French races showed that the makers still have a lot to learn before the 122-in. engine will become perfected for racing. Many things showed up in the races which were not in evidence during the practice period. When the cars were pushed to the limit, defects showed up which were not looked for, and of which there had been no evidence in practice.

Results of Alloy Pistons

Among the various problems is the use of metals other than steel or aluminum for pistons. The results obtained with magnesium pistons were not brilliant. The Rolland-Pilain engines had pistons of this metal for the practice period, but after several breakages aluminum had to be substituted. Fiat limited its experiments with magnesium pistons to bench tests, all the road work being done with aluminum pistons. The three Bignan cars which ran in the fuel consumption race used magnesium pistons, but owing to the fact that these cars were not in the race for long and were never pushed, no lessons could be learned.

The use of roller bearings in these small engines is receiving much attention. Fiat seems to have solved the problem with a type of roller bearing designed and built in its own shops, which stood up perfectly on all three cars, when used for every part of the engine with the exception of the wrist pins.

Rolland-Pilain also made use of roller bearings in the connecting rods, but instead of the single row adopted by Fiat, made use of a double row staggered, each roller measuring 8 mm. diameter by 10 mm. long. Fiat had the same diameter roller, but with an increased length, for only a single row was used. While the Fiat construction gave satisfaction, defects which led to the breakage of connecting rods were developed on the Rolland Pilains.

Valves Spring Operated

Positive methods of valve closing, to overcome "floating" at high crankshaft speeds, were given attention. Fiat worked on this problem for a long time and took out patents covering positive valve closing mechanism, but decided that there was no present application for racing purposes. The Grand Prix engines had normal cam opening, with an overhead camshaft and a very light follower between the cam and valve stem, and three concentric springs to assure the closing of the valve. These springs were made in the Fiat shops.

Rolland-Pilain had endeavored to run in the race with a positive valve closing mechanism, but so many difficulties were encountered during the preparatory period that it was decided to change the cylinder head and use spring-controlled valves. Bignan ran with a positive valve closing mechanism, but the cars were not tested sufficiently for any important deductions to be made. In this connection attention is being revived in the possibility of the Knight engine for racing under limited piston displacement rules. In order to decrease internal friction, Panhard-Levassor has been successful in white-metaling the sleeves. Up to the present the engines on which this has been done have only been used in short-distance events.

Ignition is not giving the same trouble as formerly, and both magneto and battery systems are standing up well. Plugs generally, are better, but it was seen in the French race that plugs which stood up perfectly in one engine gave trouble when used in an identical engine running at 300 revolutions more.

There is much work to be done to get weight down to the 1,434 lbs. minimum under the new rules. Only Fiat has succeeded in doing this on cars produced up to the present, some of the others being very considerably above the minimum. Front axle design calls for attention in order to provide for tortional stresses involved with front wheel brakes. Examples in this connection are the Sunbeam build-up axles with H-section centerpieces and tubular end pieces, and the Fiat design of a tubular two-piece built-up axle.

Scientific streamlining called for more attention this year than ever before, but still leaves room for progress. Fiat made experiments on models in a wind tunnel, the work being carried out by its airplane experts, and thus secured the best results. Among the mistakes made was too low a clearance, thus setting up considerable skin friction under the car. In the endeavor to include all accessories within the streamlining, designers were led into adopting shapes of an exaggerated section.

It is difficult to get a perfectly streamlined body without modifications of the chassis. Thus to get an ideal shape Fiat had to use bowed frame members, having the same sweep towards the rear as the body. A point in this connection is that it involves bringing the two rear springs towards the center, in order to get them enclosed, and thus gives a long length of axle housing unsupported outside the spring pads.

Average Peak About 90 H. P.

Accurate information concerning the power available from existing 122 cu. in. engines is not obtainable, for the simple reason that every competitor has an interest in giving out erroneous figures. It has been stated that the Fiat developed 96 hp., but there is every reason to believe that the peak was very little above 90. The Sunbeams developed between 89 and 90. The Rolland-Pilains gave off 84 hp. Bugatti declares that one of his 122 cu. in. engines has held 99.78 hp. at 4.825 r.p.m. This is more than anybody else claims to have obtained and is a vast improvement on what was secured in the race.

The 122-in. cars will next be seen under test in the Italian Grand Prix.

PROFITING FROM EUROPE

The Indianapolis 500-mile race for 1923 will be for cars fitted with engines having not more than 122-cu. in. piston displacement. Since Europe has already run several races with engines of this size there is at hand quite a bit of information regarding the performance of these engines. Remarkable speeds have been obtained; the Fiat, for instance, which won the Grand Prix is said to be capable of 5,000 r. p. m. at which point it shows something like 90 hp. The article on this page goes into detail on some of the problems, which, as yet, confront engineers and designers in the development of these small and high-speed engines.

An Ideal Electrical Service Station in the Making—No. 3

The Ole Timer's Test Coil

THE self made man who has made a reputation for himself and is known for his ability to locate and remedy any kind of trouble on the motor car, is often prejudiced against "book learnin'," and is opposed to the college man who tries to use his "book learnin'" in the maintenance shop. On the other hand the college chap is too often conceited and rarely gives the old timer's experience the rating it deserves.

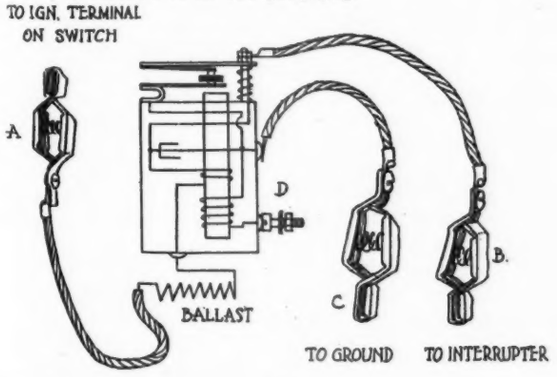
The ideal combination is obtained when the man of experience also uses his head and studies all the new things he can lay his hands on, applying them to his daily work where ever they are applicable. On the other hand the college chap will also round out into a good practical man if he forgets how clever he is and gets into the grease and dirt for a while.

In the repair of electrical systems, two types of men will be encountered, one type where the replacement of burnt brushes is considered the end of the job, while the other type of man will not only replace the brushes, but also try to figure out the cause of their burning, especially if they have required replacing after only a short period of use.

When it comes to electrical trouble, the method of testing that gets the car going is the one to use regardless of whether it seems to be a highbrow method or the opposite variety.

Then, when we consider that more cars get stuck on the road due to electrical trouble than to any other one cause, it is apparent that the repair man should be well equipped to handle work of this nature.

In the Aug. 10th issue of MOTOR AGE there were given methods of using a piece of lamp cord and a spare condenser to make various tests on the ignition system, these being sufficient to check everything except trouble in the coil itself, of the secondary insulation, which allows the spark to jump inside the coil instead of at the plug gap.



OLE TIMERS TEST COIL FIG·1·

Now as it happens, there is no known test for this sort of trouble except to try another coil, but the repair man starting out on the road to service a car that he has never seen before, is often unaware of the type of ignition coil that it uses and consequently can not be sure that he is taking a coil that is suitable for the job.

The substitute test coil shown in Fig. 1, will therefore be a valuable piece of equipment to add to the lamp cord and the spare condenser. It is made from a Ford coil as shown, wire and test slips being soldered to the regular terminals and to the vibrator adjusting screw, while a piece of fibre or thin wood is placed between the contacts to separate them.

With this outfit it is possible to go to almost any car having 6 volt battery ignition, discount the coil and hook up the test coil. The terminal marked "D" should be connected to the center of the distributor cap, the rubber covered wire already on this distributor terminal being available for this connection.

The resistance at the bottom of the coil which is marked "ballast" can be made of iron wire or German silver wire, and should be such that the coil will draw about 5 amperes when connected to a 6 volt battery, that is with clips "A" and "B" on the battery terminals. If iron wire is used it will be found that the current will drop off if left connected to the battery when checking the value of this resistance. This is due to the increase in resistance of the iron wire as it heats up, and the correct value would be 5 amperes at first or about 3.6 amperes after the iron wire gets hot.

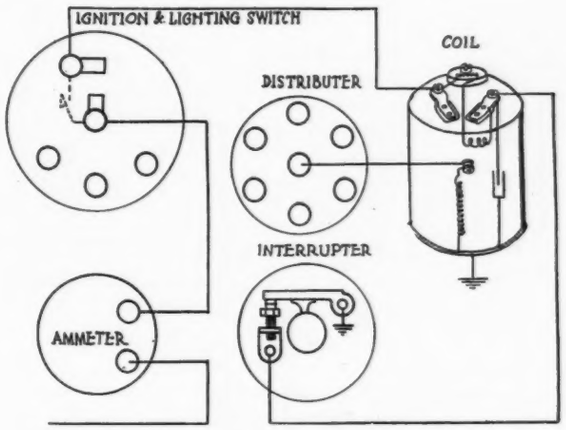


FIG 2
IGNITION WIRING ON OAKLAND 34-C

To illustrate the use of a test coil of this kind, part of the wiring of an Oakland car is shown in Fig. 2, this being the part that shows the ignition circuits. We will now assume that it is desirable to try the test coil on the car, in place of the regular coil, and in Fig. 3 the connections are shown. Note that in Fig. 3 we are using nothing but the interrupter points and the distributor of the regular ignition system.

It should be observed that the wire "C" of the test coil when grounded connects the test condenser across the interrupter, but that this condenser would not be necessary if there was already a good one in the interrupter. In this case wire "C" should be connected up to wire "B" which will both eliminate the use of an extra condenser, and also provide a return for the secondary current.

Use of the Ford coil as prepared in this way should be confined to testing and temporary use only. There are several reason for this. First the coil is not water proof and second does not harmonize with the other fittings on a medium or high priced car, and the car owner should be so advised when a testing device of this kind is used.

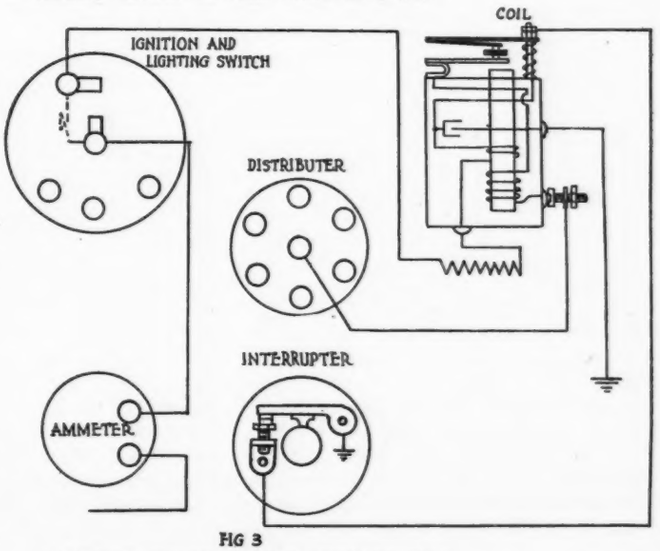


FIG 3
OLE TIMERS TEST COIL USED ON OAKLAND 34-C

Interesting and Romantic History of 16-Year-Old Tractors

Six of First Fifteen Made by One Company Are Found to be Laboring Faithfully and Satisfactorily at Hard Jobs on the Farm

SCATTERED here and there through the agricultural sections of the United States are a few old tractors which were manufactured as early as 1905, 1906 and 1907. These pioneering machines in the application of mechanical power to farming were sold by dealers in farm implements and were put to work at once at the tasks for which they were made.

It would seem logical to say that all of these machines, having fulfilled their days of usefulness, are now rusting away in fence corners and forgotten places, while newer and later models do the work.

But such a statement would not be true. It is true that since 1905 thousands of newer tractors have been sold and put to work, but recent investigation has established that a considerable number of the tractors made in 1905, 1906 and 1907 are still in service, and satisfactory service at that. How long, then, will a tractor last? "Just as long as you take care of it and use it without abuse," says the manufacturer whose research has revealed the interesting and even romantic histories of some of these pioneer machines.

Looking back over the history of the tractor industry, some of the officials of the International Harvester Co. wondered if they could obtain the remains of one of the very first tractors made by that company so they could keep it around as a sort of relic. Imagine their surprise when the owner of a tractor sold in 1906 informed them coolly that he didn't want to sell it but might consider parting with it after the cane grinding season was over! The price, well, he wouldn't take less than $500.

Locating Oldest Tractors

The basis for this research into tractor history was an old journal in which was entered in ink the serial numbers and the names of the purchasers of the first of International Harvester Co.'s tractors. The first tractor truck shipped was numbered 1196 and the others consecutively after that. Letters were sent to the dealers through whom these early tractors were sold and they were given the name and address of the purchaser, as shown in the old journal. The dealers were asked to try to find at least one of these old machines which was near enough all together that it could be shipped back to the factory to take its place as a curiosity.

One of the first replies told the history of tractor No. 1199, the fourth machine shipped from the factory. This machine is now owned by the Stark Brothers' nursery at Louisiana, Mo., and the branch manager through whom it was originally sold stated that repairs were ordered for it about a year ago, indicating that it might still be in service. Here is the branch manager's interesting report on it:

"This tractor, together with an experimental hay press, was sold to Mr. Wm. Ashburn, at Ashburn, Mo., through the firm of Frier-Jacquin Hardware Co., Louisiana, Mo.

"The writer, in company with Mr. W. J. Jacquin of the above firm, went to Ashburn in Mr. Jacquin's gasoline launch to make this sale, due to few trains stopping at Ashburn, the town being located on the bank of the Mississippi river.

"We wrote Mr. Ashburn's order for tractor and hay press, which he purchased for the purpose of baling straw, being located in a very good wheat section, where there was considerable straw to be baled that summer and fall.

"Just how long Mr. Ashburn used this tractor cannot definitely say, but think he operated it about two years, then the firm of Frier-Jacquin Hardware Company consummated a sale between Mr. Ashburn, Stark Brothers, and themselves, so in this way Stark Brothers came into possession of the outfit.

"Stark Brothers used this tractor and press for various kinds of work, such as baling straw, the packing and shipping of fruit trees and other uses about their nursery. I believe they have used this tractor up until within the last year or so and perhaps are now using it, as our repair men informed us they ordered repairs about a year ago for this tractor, which would indicate it is still in use, but we are not positive as to this."

A letter was sent to Stark Brothers and on July 7, 1922, they replied: "We are owners of the tractor you sold to William Ashburn, at Ashburn, Mo. We still have same in our possession in a fairly good state of preservation."

A LIFE history of 15 years at the hardest kind of labor—that's what this tractor has to its credit. It was sold in 1907 to Isaac Whipp of Burlington, W. Va., and here is Mr. Whipp's own story of its achievements:

"This engine was purchased by my father and me and was unloaded from the car in 1907. The purchase price was $1000, f.o.b. Keyser, W. Va. I used this engine to pull an Eli baler fifteen seasons, doing custom work. I have sawed 1,200,000 feet of lumber with it, using a No. 2 sawmill. Have pulled a road grader, and sawed thousands of cords of wood with a cut off saw. Besides, we use it to fill our silo and grind feed for our own farm. Am sawing with it now. I use ten gallons of gasoline per day for sawing and five or six gallons per day for baling hay or straw. Can bale from 12 to 18 tons per day. I have bought but very few repairs; the same spur gear pinions are still in the gears, and the same fibre friction clutch pulleys. Have bought but one small piece of repairs in six years."

Sixth Tractor Still Working

The sixth tractor shipped by this company was No. 1202, and it was found still in service for belt work. Here is the brief but eloquent report on it:

"This tractor was originally sold by Prosser & DeKay, Cuba, N. Y., to Frank Adams of Cuba. He used it until 1916 and then sold it to P. C. Wixson, Black Creek, N. Y., and the belt power part of it is still in use running feed grinder and ensilage cutter."

Here is tractor No. 1909—one of the first 15 put out. E. J. Allen, who sold this tractor in 1906, reported:

"I sold this tractor to the Patmos Lumber Co. and they pulled a sawmill with it until they cut out. I helped them convert it into a locomotive and run it on a wooden track. They then sold it to a mill company at Waldo, Ark. The last company used it until they cut out their timber and Mr. Tilson of Texarkana bought it for $250 and sold it to the present owner, Mr. Mike Braumiller. It is pulling a silo filler and looks good considering the rough use it has had during the sixteen years it has been used.

"I could not but have a strong feeling when I looked at the old tractor today. It brought up forgotten incidents of the past and reminded me of my past experience with a tractor, for this was the first one I had ever seen. I pulled twenty-five wagons through the main streets of Hope with that tractor. Of course, they were empty, as you would

naturally expect. They were to start with, but I had not gone far before they were filled with boys and men and, when we had a photograph taken, there were seventy-five people in the twenty-five wagons."

Tractor No. 1210, another of the first fifteen built in 1906 and sold to Mayfield & Brown, Rosslyn, Va., has been located by the investigator, who says:

"This tractor is now owned by H. H. and A. O. Edmondson, McLean, Va., and can be purchased for the sum of $400. It seems to be in fair condition and is used both for drawbar and belt work when needed. I tried bidding $200 and $300 for it, but the price stated is the best it can be bought for."

16 Years Old—Worth $500

If any automobile dealer, harking back to his days on the farm with visions of plows and mowers and other machines rusting out in fence corners, believes $400 is a high price to ask for a 16-year-old tractor, let him consider this one, No. 1212, the sixteenth machine shipped from the factory in 1906. Only $500 is asked for this machine by the present owner. Here is the dealer's report:

"In reply to letter in regard to this model of tractor, Mr. Joseph Wolke, Trowbridge, Ill., has this engine. The engine number and truck number are the same as in letter. He says he has had this outfit about fifteen years and that it is in good running order. He saws wood, pulls hay baler and cane mill. He says he will not sell it now but might after cane grinding is over. He says he will not take less than $500. The engine number is OB140E. He gave me the truck number from his record, No. 1212."

Albert Killian, of Plainfield, Ind., had vision and faith enough in 1906 in the farm tractor to invest his hard-earned money in one. His tractor is still turning gas into useful power and has been doing this going on 17 years. Assistant Branch Manager Timmons, Evansville, Ind,. reported:

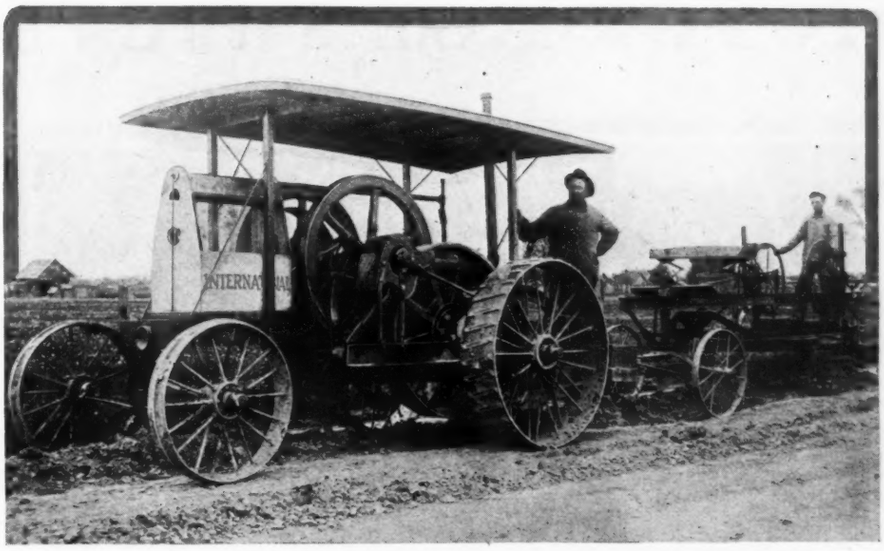
"According to the records of the employe who made delivery of this tractor, this sale was made in July of 1906 and delivery was made in September. This tractor has been used most of the time in operating a sheller connected with the elevator owned by Albert Killian, and is in use this date."

Thus far in the investigation, six of the first 15 tractors the company put out, or more than one-third, have been found still in service. A large number of those sold in 1907 were located, but they haven't yet completed 16 years of service.

The owner of one of these, Elmer Rapalee of Dundee, N. Y., reported that a man wanted to buy it and he had to buy some repairs because a part had been stolen off of it.

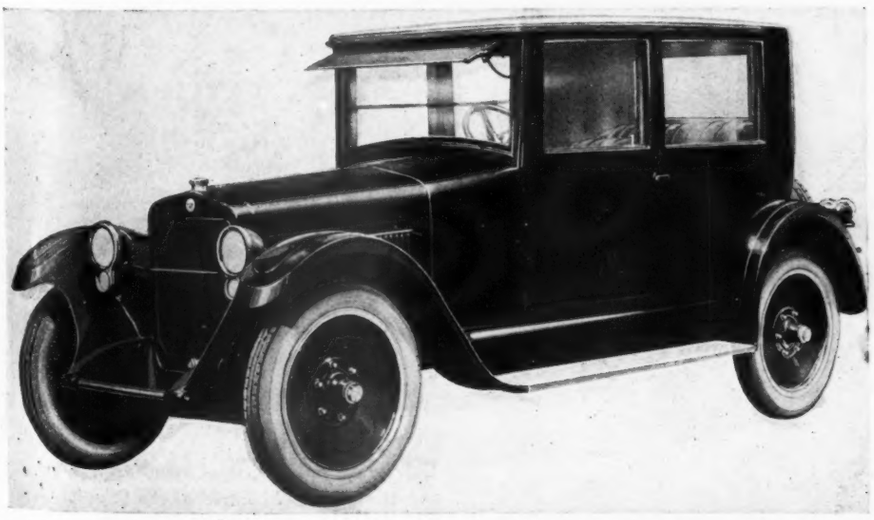
The thirty-fourth machine made by the company, No. 1230, was found to be still in service for belt power. It is owned by Hintzman Brothers, Marine City, Mich. It was originally shipped to W. J. Roberts at Marine City, who sold it to Joe Bammel. Bammel used it four years and then traded it in on a newer model. It was then sold to the present owners for $250. For years this tractor was used to pull a road grader in the vicinity of Marine City.

Tractor No. 1280 was sold in 1907. This is in the hands of Byran Brink, of Morenci, Mich., and still in good condition.



This is the International 15-hp. tractor sold in 1907 to Joseph Bammel, Marine City, Michigan, now owned by Hintzman Bros. In spite of 15 years of hard service, this tractor is still in the running and doing useful work. It is shown in the illustration pulling a road grader

New Wills St. Claire Five Passenger Brougham

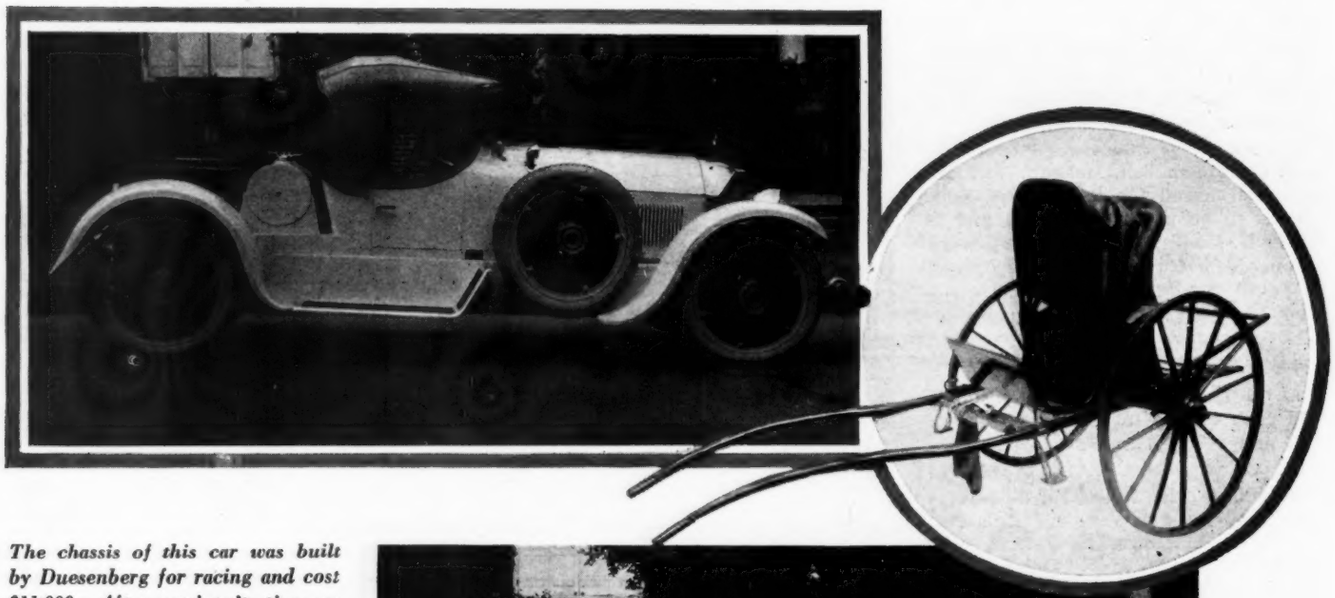


The new five-passenger brougham recently added to the Wills-Sainte Claire line. This is a Fisher body mounted on a standard eight-cylinder chassis. It is a two-door model with 29-in. door width.

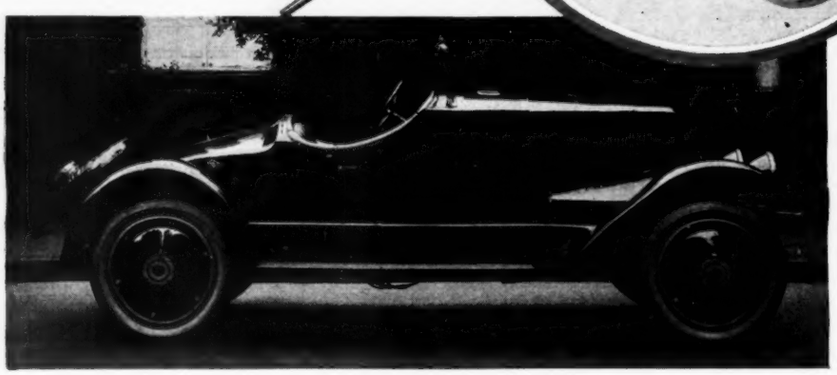
A five-passenger brougham has just been added to the Wills Sainte Claire line. This is a Fisher body mounted on the standard eight-cylinder chassis. The new body has been designed with a view to interior convenience. It is a two door body, the door width being 29 in. Access to the rear compartment is by either door and is facilitated by the tilting front seats, which are in reality two deeply upholstered chairs. There is room for three passengers in the rear seat.

Granite weave upholstery in grey velour is provided and the body colors are blue and maroon with the upper panels black. Special disk wheels, designed to conform with the lines of the body, are fitted. A trunk platform with nickel bars on the rear is standard. The lighting equipment includes combined large and small headlamps with the large headlamps tilting by magnetic control from the steering column. The car sells for $3,375 f. o. b. Marysville.

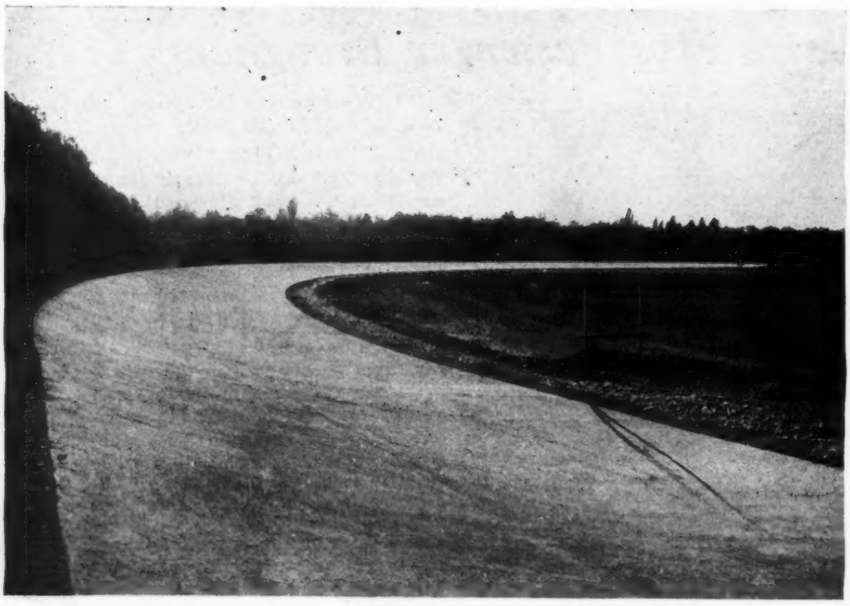
MOTOR AGE'S PICTURE PAGES



The chassis of this car was built by Duesenberg for racing and cost $11,000. After serving its time on the track its wheelbase was lengthened to 136 inches and the gear ratio was changed. The sport body shown here was built for it by Schutte. It is in striking contrast to the "One Horse Shay," in circle at right, which now reposes in the Smithsonian Institute at Washington



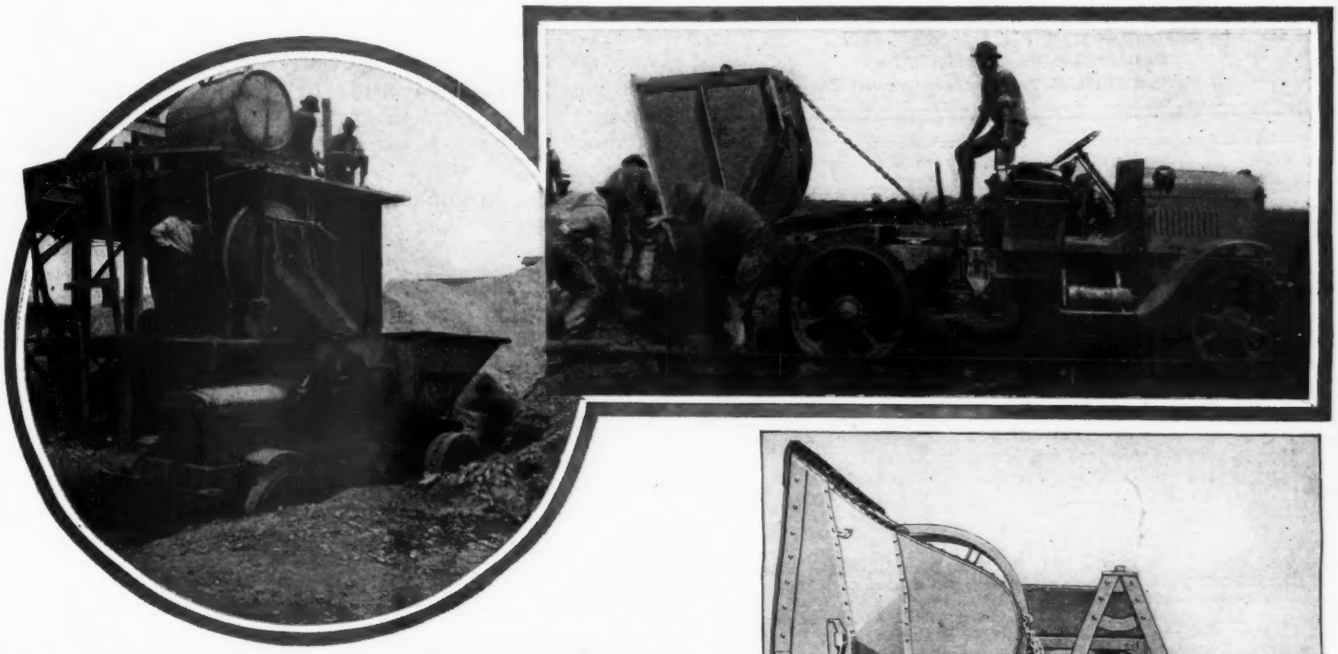
Here is a sport body built by Schutte and mounted on a Franklin chassis. The body, hood and wheels are of aluminum, keeping the car light in weight



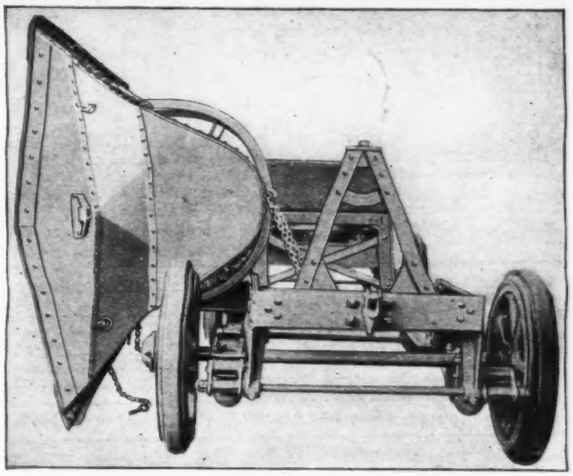
One of the broad curves of the Monza speedway near Milan, Italy, on which the first race was run Sept. 3. This speedway is 6.2 miles around

Charles M. Schwab, steel manufacturer, who recently acquired control of the Stutz Motor Car Co., is shown here in a striking pose. He might be watching one of his cars taking a fast turn such as that shown at the left

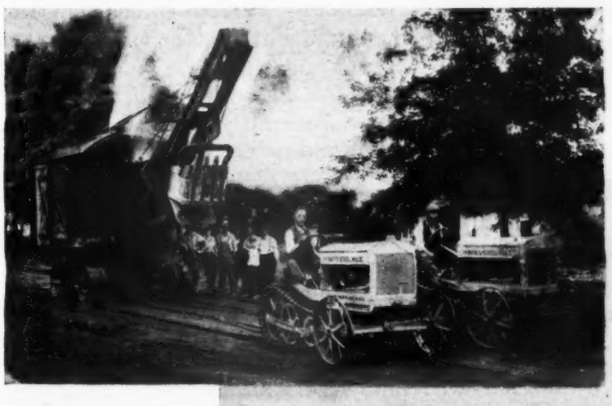
OF AUTOMOTIVE INTEREST



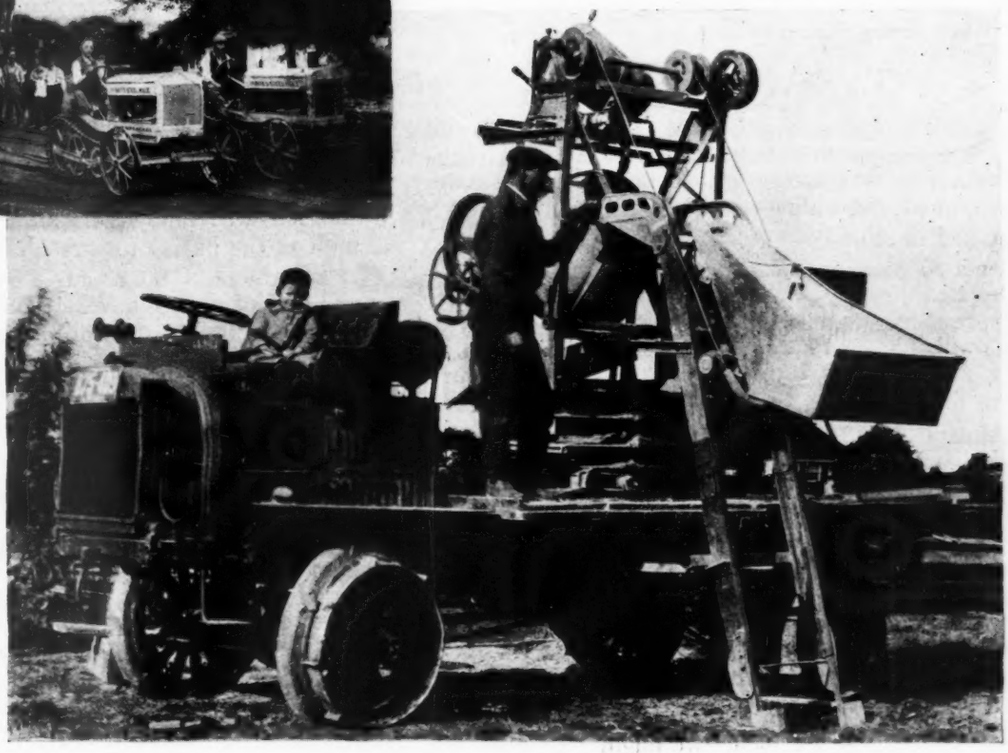
These photographs show road building along the Lincoln Highway near Independence, Ia. These huge trucks, with dump bodies capable of hauling two yards of wet concrete mixture, were designed especially for the job by the Minneapolis Steel & Machinery Co.



A handy dump trailer built in a variety of sizes by the Automotive Trailer Corp.



Photograph above shows two Bates "Steel Mule" tractors moving a 22-ton steam shovel and other machinery from one job to another for an Ohio road building contractor.



The owner of this outfit, a Long Island contractor, found after mounting the mixer on his FWD truck that the wheels were inclined to sink in soft places. To overcome this, he mounted 10 in. steel flanges on the front wheels and 12 in. flanges on the rear wheels

MOTOR AGE

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To Save a Nickel

"GOOD morning, Mr. Carr; how's business?" said the equipment salesman, conscious as he spoke that he was leaving a loop hole where an order might slip away, but willing to take a chance on an experiment he had in mind.

"Oh, not so good; in fact, pretty dull; especially in the shop," replied the shop owner, accepting the bait and starting to spread the gospel of gloom. "You see," he added, the car owners around here mostly do their own repairing trying to save a nickle, so that we don't have enough work to pay us to spend much for equipment."

"I think I see the point," said the salesman, "you naturally have to charge so much an hour for your labor on each job, and, on account of the time it takes, the bills naturally come up pretty high. You can't afford to cut the bills, for you have to pay your men for the time they work, and yet the high price of repairing makes the car owners do every possible overhaul job themselves, and you only get the lemons."

To Mr. Carr it was a pleasing experience to have a salesman extend sympathy to him in his business troubles, and he warmed up immediately.

"Of course," Mr. Carr replied, "we might cut the time on some jobs if we had some of the equipment you fellows sell, but it costs too durn much."

This was exactly the opening the salesman had been looking for, and with his prospect now thoroughly attentive, it was easy to put down facts and figures which showed conclusively that real profits were only possible with quantity business. Quantity business was obviously possible to handle only with the best time and labor saving machinery, and with gages and jigs that would insure accuracy on every job, and the elimination of comeback jobs.

It was also easy to show that the increased income with quantity business would quickly pay for the needed equipment.

Then and there Mr. Carr decided to revolutionize his business and do each and every service operation at such a cost that the car owner could no longer afford to do his own work, when he considered the grief he would encounter in comparison with the reasonable charges of the up-to-date maintenance station.

Too many people are looking for a patent medicine that will cure their business troubles. Exercise of business sense and diet of hard work are the cures.

Schooling the Profiteers

DECISION to suspend operation of all the manufacturing plants of the largest single unit of the automotive industry—that well-nigh universal institution presided over by Henry Ford,—announced at Detroit, has not only stirred intense discussion throughout the industry, but has brought a peep or two from Wall Street and maybe a chuckle or two from some other quarters.

Coming on the heels of the greatest manufacturing and selling season the motor car industry has ever experienced and at a time when the Fords claim their daily orders exceed their utmost production effort of some 5,000 cars a day, the announcement has been variously received, some persons accepting without question Ford's stated reason that he could not get sufficient coal unless he paid an exorbitant price, and others variously professing to see in it a bold advertising move, a camouflaged means of reducing output, and inventory in the face of declining sales, or a clever bid for popular acclaim as the basis of a presidential campaign.

Of this there is no doubt—slowly rising steel prices were in evidence as a result of the coal strike even before one of the greatest producers announced a 20 per cent wage increase for its employes. The gradual depletion of coal reserves which virtually had reached the point of exhaustion by the time a settlement was reached in the bituminous fields, finds the approach of cold weather creating a demand which it appears impossible to meet. Such supplies of fuel as are available naturally are sold at a higher price than if the commodity were a drug on the market, and it is even possible that with demand growing sharper and without adequate Federal control a situation might develop of coal being sold to the highest bidder. Under such circumstances Ford undoubtedly could continue to buy coal as long as there was any left, but how about the lesser manufacturers, the public institutions and the homes of the poor?

Paying his compliments to Wall Street in character-

istic fashion, Ford declares he does not intend to be a party to any such condition by beginning to pay the rising prices to the ascent of which he believes there would be no end. In other words, having decided the profiteers need a little schooling, under a stern master, Henry Ford has volunteered for the job.

Whether or not there is a hidden motive in this unusual action and whatever its apparent effect, it is reasonably certain that the product of Henry Ford's factories will not be permitted to disappear from the face of the earth for lack of replenishment.

"Our salesmen will not discuss with customers, products we do not sell," is one of the iron rules of a successful Chicago dealer.

Warming Up an Engine

MANY of the maintenance problems which confront automotive dealers could be made much easier to cope with if car owners were properly instructed in the handling of their engines. In this respect the question of warming up an engine may be mentioned, and, while this particular problem becomes more acute as cold weather approaches, there is, nevertheless, something to be said about it even during the summer months.

Service salesmen, new car salesmen, repairmen and all others engaged in any way in the selling or maintenance of automotive vehicles should impress on their customers that the gasoline engine is first of all a heat engine. It must be hot enough to properly perform its functions. Those who have seen race cars groomed for a race know that the engines in these always are run slowly for quite a time before the race, "to warm them up." The same thing is true of aviation engines. No aviator would think of taking up a 'plane until his engine has been thoroughly warmed up. Those who have witnessed gasoline engine tests on the dynamometer know how vastly much better an engine runs when operating at its correct working temperature.

Most motorists start their engines up in the morning, pull the choke out and immediately run their cars out of the garage. Their impression is, perhaps, that the engine warms up during the first few miles of travel. And so it does, but often at the expense of cylinder walls, pistons, bearings, etc. Dilution of oil is at its worst with a cold engine, because we need all the heat we can get to the fuel to vaporize it. Diluted oil means cutting of the oil film on the cylinder walls and bearings, and this wear is accelerated by putting an engine under a load while it still is cold.

The man who drives to his place of business every day under the above conditions, especially if he has less than 10 miles to travel, hardly gets his engine to a correct working temperature, unless he allows it to idle slowly for several minutes before he drives the car.

The large oil companies, car makers, dealers and service men all advocate draining the oil in the crankcase every 500 miles or so, which is to be highly recommended. But we believe they should go a step further and impress upon the motorist the importance of allowing his engine to get properly warmed up before it is asked to propel the car, truck or whatever the vehicle may be.

By all means instruct your customers to not race their engines or open the cut-out when starting up. An engine warms up much better by letting it idle slowly. An open cutout takes away too much heat, that otherwise might be of use in getting the engine warmed up.

What the owner of a new car says about it to his wife after he has had it awhile is much more important to the dealer than what he says about it to his business associates.

The Flat Rate for Labor

And the Bill for the Parts

ONCE upon a time there was a Tightwad who was sold on the Flat Rate plan for a job that needed to be done on the front axle of his car, for the labor charge was very reasonable, and with the limited facilities in his own garage he knew he would be messing around every night for a week or so before he could complete the job if he tried to do it himself.

It was therefore with a feeling of relief that he left his car for the work in question, but the feeling of relief changed to dismay when the bill was presented. The labor charge had sunk into insignificance in comparison with the charge for parts that had been used. Apparently the tires and parts of the wheels had withstood the rigid inspection of the mechanics on the job, but otherwise all parts included in the front part of the car seemed to have been replaced.

Not being utterly ignorant of mechanical things, the Tightwad ran down the list of unintelligible part numbers that made up the itemized list, asking the foreman to interpret each one in turn. He finally hit on one the replacing of which seemed unnecessary beyond shadow of a doubt. He asked to see the old part, which was brought forth with the explanation that the threads were stripped. Casual inspection showed that they were rusty, but apparently O. K., so the mechanic was asked to put the part in a vise, put on the nut and see if he really could strip the thread. The challenge was not accepted, but instead the mechanic offered to put the old part back and have the foreman take the cost of the new one off of the bill, a tacit admission that new parts had been put in promiscuously without due regard as to their actual need.

It must be said, in defense of the service station, that with the flat rate labor charge the shop cannot afford to take a chance of a comeback, so that when in doubt new parts are put in rather than risk the use of the old ones. The fact that each job is a chance to sell a quantity of parts, however, is a temptation against which the shop must always work, as indiscriminate use of new parts will drive the Tightwad back to his alley repairs, just as he is on the verge of being converted.

Time was when flat rates for labor were considered impracticable. The contention was advanced that there was no telling just how long a job would take. Improved equipment, combined with experienced men on each particular job, has shown the fallacy of this argument, and the time may not be far distant when flat rates will include material as well as labor, this being the practice at present in some shops. Until this practice is general, the shop foreman will do well to ask himself, "If this were my car, and I had to pay for the new part, would I wish to have it put in?" On the answer to this question depends the business that the shop will do with the Tightwad, for he will not object to paying for parts really needed, but he is justly incensed if parts are replaced for technical defects only.

Ford Alone in Closing Move

Most Factories Able to Get Power to Continue Operation

Plan to Keep Production Abreast of Demand—Rail Strike Causes Uneasiness

NEW YORK, Sept. 6—Henry Ford's announcement of his intention to close his plants Sept. 16 because of the coal situation has not upset the rest of the automotive industry to any appreciable extent. Other leaders are making every effort to meet the situation and keep their factories up to the record-breaking production pace the industry as a whole has been hitting the last few months. They will keep the wheels turning just so long as they have any coal left.

A survey of the industry shows that nearly every one is able to secure the necessary power and that they will not have to worry over the situation for at least two weeks more.

More serious, in the minds of many, is what will happen following the end of the coal strike. It is feared that the railroads will be called upon to haul so much coal as well as handle the crops that industry as a whole will suffer through inability to secure transportation needed to bring materials into the factories and deliver the finished product into the hands of the dealers. It is thought that this situation may slow things a bit, although driveaways will relieve the situation for deliveries.

Outside of the coal and transportation situations, the automotive industry is enjoying an unexpected prosperity. Production is being maintained at a record-breaking clip and it is declared that when the August reports are all in it will be found that the industry has made more cars in the eight months of 1922 than it did in all of 1921. Indeed, it is believed that the production figures for the full year of 1922 will be greater even than the record-breaking 1920, when 2,205,000 motor vehicles were turned out.

This prosperity is not confined to the car makers alone. The parts people are keeping step with their customers. Reports received show that there are enough orders on hand right now to keep the parts and accessories plants busy until after January. A surprising angle is that within the past week some of the leaders have had orders already received increased, which shows that the car manufacturers have no intention of slowing production at their end of the line.

SERVICE ASSOCIATION CLAM BAKE

NEW YORK, Sept. 5—The Automotive Service Association of New York will hold its Third Annual Clam Bake and Outing at Glenwood-on-the-Sound on Sept. 24.

CHARLES A. SINGER, JR., DIES

NEW YORK, Sept. 1—Charles A. Singer, Jr., died suddenly in a New York hospital yesterday. For several years he was prominently identified with the company manufacturing the Palmer-Singer cars, his father, Charles A. Singer, Sr., being president of the concern. The company passed out of the automobile industry six years ago and since the end of the war Singer, Jr., had been a member of the firm of Partridge, Singer & Baldwin, which is an exporter, specializing in the sale abroad of American cars.

"Slow" Driver Fined For Obstructing Traffic

CHICAGO, Aug. 31—A motorist who was arrested in Evanston on a charge of speeding entered the defense that his car could not speed. "I was going only 15 miles an hour," he said to Justice of the Peace Boyer. "Only 15 miles an hour on a busy boulevard!" exclaimed the Justice. "Twenty dollars and costs for obstructing traffic."

OTTAWA SHOW IN THREE SECTIONS

OTTAWA, Ont., Sept. 1—Ottawa Central Canada Exhibition being held Sept. 8 to 18, will be in three sections. The first will be devoted to automobiles, the second to accessories and the third to trucks. In addition to these three sections the agricultural implement manufacturers will have a show of their own demonstrating motor driven farm machinery.

FORDSON SHOW IN GEORGIA

ATLANTA, Ga., Sept. 2—The Southeastern Fordson Industrial Exposition held in Atlanta Aug. 29 to 31 proved to be the largest tractor and power farming equipment show ever held in the southeast, attendants the first day of the show being estimated at more than 10,000.

Approximately 250 Ford dealers from the territory handled by the Atlanta Ford branch attended the show, and business meetings were held each day to discuss plans for the coming year. The show was under the auspices of the Atlanta branch of the Ford Motor Co., with the co-operation of several manufacturers of power farming equipment who also had their products on display.

HELPING MOTORISTS IN OHIO

COLUMBUS, O., Sept. 2—A thousand metal signs showing directions and distances are now being put out throughout Ohio by the State Highway Department. These signs have white letters with a dark blue background and show up well under any condition. They will be placed principally at cross roads.

Special Ford Wins Fourth Annual Pike's Peak Climb

Makes 12 Miles Up Steep Grades in 19 Minutes and 50 Seconds on Labor Day

DENVER, Sept. 4—The winning of the Penrose trophy for the fastest time in the Pike's Peak fourth annual hill climb today was a surprise to the 5,000 spectators when it went to a Ford special in the less than 183 cubic inch displacement class. The driver was Noel E. Bullock and the time was 19 minutes 50 4/5 seconds for the 12 2/5 mile course of seven to 10½ per cent grades and 60 curves, mostly sharp switchbacks.

Glen Schult in an Essex and Roy W. Beavers in a Chevrolet took second and third in this small car event in 20 minutes and 41 seconds, and 23 minutes 3 2/5 seconds, respectively.

The first three places in event No. 2, for up to 300 cubic inches displacement went to Harold Brinker in a Wills-Sainte Claire, H. L. Chapin in a Dodge and Sam Marcus in a Haynes, in 20 minutes 46 seconds, 23 minutes 25 4/5 seconds and 24 minutes 18 4/5 seconds. A Hudson driven by King Rhiley, winner of trophy last year, won first prize today in the event for cars above 300 cubic inches in 20 minutes and five seconds, with a Packard driven by P. B. Abbott only two seconds behind, and a Mercer piloted by W. S. Haines captured third place in this large-car event in 20 minutes and 31 seconds.

Eighteen cars started and 15 finished, three being forced out by slight breakages, but there were no serious accidents. Bullock and Rhiley are both Nebraskans, Haines hails from the Mercer factory, while most of the other contestants are from Colorado Springs, Denver and other Colorado points.

All three events were for non-stock cars, with $2,100 in cash prizes divided into firsts and seconds of $500 and $200 for each event. The program was a success in attendance, racing talent, officials, management, sportsmanship and all other respects, according to Traffic Manager F. C. Matthews of the Pike's Peak Auto Highway Co., which staged the meet on its own world-famed highway with cooperation of Colorado Springs Chamber of Commerce and under official sanction of American Automobile Association. While weather was ideal today, a terriffic storm yesterday soaked and gullied the road badly and a crew of experts working all night, although able to overcome nearly all the damage, were forced to leave some stretches near the top of the peak still heavy when races started.

Dealers Spread Courtesy Campaign

New York Mayor Asks Installation of Bus Line

Would Save Coal and Be of Value In Normal Times, He Says

NEW YORK, Aug. 31—Mayor Hylan, in a statement just issued, urges that the special session of the New York Legislature, which has been called to enact legislation on the coal situation, give him the necessary authority to establish a municipal motor bus line, which he thinks would save coal during the present crisis as well as being useful in ordinary times.

Mayor Hylan has tried three times before this to induce the legislature to enact a law which would permit him to try this experiment. Already he has tried it out with privately owned makeshift busses and he thinks that if the city can operate its own busses a transportation problem will be solved.

"Surface transportation in a large city is too cumbersome and too expensive to meet traffic needs," says the mayor in his statement. "Surface cars must be run on iron and steel rails laid in the middle of the streets and must be propelled by electric power obtained from overhead or underground wires and generated from coal. A large preliminary outlay is required to equip such a surface system and a very large supply of coal always must be on hand and assured in order to continue the operation of such a system.

"No such large initial outlay is required to equip and operate a motor bus system that can accommodate and provide for as many passengers as a surface car system. In fact, the original outlay for a motor bus system that could accomodate as much traffic as a surface car system would be about one-fifth of the cost of the latter. For $25,000,000 the city of New York can provide a bus system that would adequately handle as many passengers as could be handled by a surface car system at an initial cost of $125,000,000.

"If the bill is passed by the legislature the city of New York will have in operation on the city streets within a few weeks after its passage a motor bus system that will become a permanent institution in the transportation of persons on the surface of the city streets."

New York is not the only city which has realized the efficiency of the motor bus and taken steps to avail itself of the advantages of cheap and trustworthy transportation. Chicago tried out motor busses during the street car and elevated strike and found them so efficient that since the settlement of the strike the Chicago Elevated lines have laid out three routes beginning at the end of three Elevated lines and extending from one to two and one-half miles through well populated districts over which 14 motor busses will operate as feeders.

TO MAINTAIN RESALE VALUE

DETROIT, Aug. 31—Capt. E. V. Rickenbacker, vice-president in charge of sales for Rickenbacker Motor Car Co., said today that his company had determined upon a policy of maintaining prices and values, so that the Rickenbacker car would always have a high resale valuation. The resale value of a car is a most important sales point, he said, and is especially important to dealers in view of the general used car situation.

Business for the fall, winter and all of 1923 should continue at a high volume, Rickenbacker said. The industry has struck a gusher in the form of enclosed car business, and this with the regular run of business will keep sales high. Rickenbacker looks for an increase in enclosed car demand, until it will total close to 90 per cent of all car business. This growth in enclosed car business may come in three years, he said, in all classes of cars.

DEFAMATION OF CHARACTER SUIT

SPRINGFIELD, Ill., Aug. 31—Suit for $100,000 defamation of character has been filed in the Sangamon circuit court against The Bruce Automobile Co., and Bert Bruce of Springfield, by James A. West, Carmi. The suit is based upon the arrest last fall of West on a charge of stealing an automobile. The charges were preferred by the Bruce company.

West set forth that he was arrested in Carmi on telegraphic orders of the Bruce company but after 61 hours in jail was released by a justice of the peace who dismissed the charge. Later, he said, he was again taken into custody on warrant sworn out by a Bruce company agent, bound to the grand jury under $1,000, and in jail 96 hours before he obtained release. The grand jury voted "no bill." He claims that his credit has been injured as result of the prosecutions.

The Bruce company will claim that West came to Springfield to get an automobile, agreed to purchase the car but drove it away from the garage without paying for it. His arrest followed in attempt to recover the machine.

J. F. DODGE'S ESTATE $36,892,588

DETROIT, Aug. 31—The late John F. Dodge left an estate which is valued at $36,892,588, according to the inventory just filed in the Probate court. Of this grand total $1,049,228.68 is represented by cash on deposit it in the banks. Dodge's 50,000 shares of Dodge Bros. stock, appraised at $46.75 a share, are given a value of $23,018,750. He also left $9,300,000 in Victory 3¾ per cent bonds, $60,000 in 3½ Liberty bonds and $500,000 in City of Detroit bonds.

Movement Chicago Trades Association Started Grows

A. A. A. and N. A. D. A. Join In Effort to Encourage Civility Among Automobile Drivers

WASHINGTON, Sept. 2—Automobiles in all parts of the United States will soon be bearing on their windshields a little green and white sticker with "AUTOMOBILE COURTESY" in large letters over the name of the local automobile club, indicating that the driver of the car is observing the courtesy campaign being conducted by the American Automobile Assn., in connection with the Chicago Automobile Trade Assn. and the National Automobile Dealers' Assn.

"We believe that 50 per cent of the automobile accidents which happen on the highways of the United States could be avoided through the use of a little automobile courtesy," said Dai H. Lewis, Acting Executive Chairman of the A. A. A. "Courtesy costs nothing and brings greater results than any other element entering into the driving of an automobile.

"Real automobile courtesy demands that we give the other fellow his share of the road; that we dim our lights when meeting another car at night; that we recognize the fact that the man behind us blowing for the road wants to get by and is not challenging us to a race; in short, it means being agreeable in all these little things that go so far toward avoiding friction."

The American Automobile Assn., in taking up with its affiliated clubs the question of carrying on this campaign is impressing the need for careful observance of traffic regulations as one of the elements of a courtesy campaign. The traffic officer, the association points out, is only a human being placed in a difficult position because of the necessity of enforcing these regulations and a little courtesy toward him will eliminate many of the more trivial arrests that now clutter up our traffic courts.

The whole operation of the courtesy campaign, the A. A. A. points out, depends entirely upon the old principle of the golden rule, "Do unto others as ye would that they should do unto you."

NEW ADVANCE-RUMELY BRANCH

OMAHA, Neb., Sept. 2—A new branch building is to be erected here by the Advance-Rumely Company. It will be at Ninth and Farnam streets and will be three stories high, of reinforced concrete with red brick facing and stone trim. As soon as the building is completed the company's branch now operated at Lincoln, Nebr., will be abandoned.

Coal Shortage in Detroit May Force Curtailment

Only 15 Days Supply on Hand, Says Detroit Edison Co. Head

DETROIT, Aug. 31—Curtailment of power to the automotive plants in this district will be necessary if conditions do not improve within 15 days. The Detroit Edison Co., has sufficient on hand for this length of time, according to Alex. Dow, president, but will have to curtail if coal shipments are not speeded up. All plants in this city with the exception of Ford are furnished with all or the major portion of their power by this concern.

According to all authorities the question of getting coal into the Detroit district is not one of mining the coal, but of moving what has already been mined. Even this condition is not general but is confined to the so-called coal belt railroads which operate South and East of the Ohio River.

The coal shortage here is far more serious than the steel situation. While some of the plants complain of cars on the road two and three weeks where formerly three and four days was sufficient, in the main the shipments are coming in fairly well. The slight increase in the price of steel is not regarded as sufficient to materially affect the cost of automobiles.

All of the plants have supplies for thirty to sixty days' supply as far as heat and special power requirements such hammer rooms, etc. are concerned. C. S. Mott of General Motors Corp. stated today that the average for the GMC units was better than 30 days for coal on hand. All of these concerns in the Detroit zone, however, are directly affected by what happens to the Detroit Edison Company, as they are not equipped to manufacture all of their own power, but simply to take care of their heating, compressed air and similar needs.

When asked to comment on Henry Ford's move in announcing a closing of the Ford plants on Sept. 16, no one was anxious to be quoted. The opinion generally expressed however, is that the move was designed to rather dramatically focus popular and perhaps legislative attention on the effects of the coal and rail strikes, even if closing proved to be eventually unnecessary. Not a few scented a political angle to the announcement.

H. H. Rice, president Cadillac Motor Car Co., summed up the situation which applies generally to the Detroit plants when he said, "When we erected our new plant we put up a large power house, which is sufficient to take care of all our heating, pumping, compressed air and similar requirements. It is not designed to be large enough to run our shops. Power for this purpose is drawn from the Detroit Edison Co. If they are forced to curtail, we will have to do likewise."

There is no thought of changing over to the use of fuel oil in Detroit, although the Ford Motor Co., has some temporary installations in their power plant in Highland Park which are working out very well. As pointed out by Mr. Dow, of the Detroit Edison Co., this would be some relief if it were a case of actual shortage of coal and not a shortage or rather a slowness in transportation. The same problems which affect the movement of coal also affect the movement of fuel oil as the oil would have to come in by rail, since Detroit has no pipe line.

Complete Program for National Used Car Conference

CHICAGO, Sept. 2—The complete program has been announced for the National Used Car Conference which will be held at the Congress Hotel, Chicago, Sept. 14 and 15. The meetings will be presided over by Robert E. Lee, secretary of the St. Louis Automobile Dealers' Assn. The program follows:

Thursday, Sept. 14; Morning and Afternoon

How Boston Dealers, Through Co-Operation and Education, Determine Actual Used Car Values—L. B. Sanders, secretary, Boston Used Car Statistical Bureau.

Eight Months of Used Car Co-Operation in New Orleans—Ginder Abbott, member, Automobile Dealers' Association of New Orleans, The Saginaw Plan—By a representative of the Saginaw (Mich.) Automobile Dealers' Assn.

What Used Car Sale Price Bulletins Have Done for the Trade—By representatives of the Detroit, St. Louis and Kansas City Automobile Dealers' Associations.

Round table discussion.

Friday, Sept. 15. Morning

Buying and Selling Used Cars at a Profit—B. B. Burns, Decatur, Ill., used car dealer; president Illinois Automotive Trade Association.

Used Car Merchandising—S. E. Comstock, vice-president, Williams & Hastings, Detroit distributor.

Round table discussion.

Afternoon

How Can We Make the Automobile Shows Sell More Cars?—Round table discussion.

FORD IN CANADA HAS COAL

WINDSOR, Ont., Sept. 1—Ford Motor Co. of Canada may have to shut down Sept. 30, according to officials of that company. While the fuel supply of the Canadian concern is fairly satisfactory, it is pointed out that the supply of a great many of the suppliers is low and this would force a closing.

DENVER DEALER FLIES TO DETROIT

DENVER, Sept. 2—Don Hogan, Rickenbacker distributor who flew to Detroit in his own plane in an effort to obtain a larger quota of cars has returned. He was delighted with the journey and stated that he intends to keep a direct liaison with the factory via the air route. Hogan flew the ship the 1,050 miles to Detroit in thirteen and one-half hours.

Dealers Prepare for Good Fall and Winter Season

Many Car Owners Having Spring Maintenance Work Done Now

CHICAGO, Sept. 2—Automobile maintenance in shops throughout the city has been at a high point since the opening of the season and during the past week has been picking up rapidly. Shops everywhere are working to capacity and some are finding it necessary to put on more men to take care of the after-vacation rush.

"Very near everyone who has a car, drove it while on their vacation," says one dealer, "and there has been more week-end touring done this year than at any other time. I have asked quite a number of the people who come in if they intend to keep their automobiles in service during the fall and winter and the majority if them say that they will, except when the snows are too heavy."

If present indications work out right, there will be plenty of cars on the streets during the cold weather this year. It has been the custom of car owners, more or less, to store the car during the winter and leave the repair work to be done in the spring, but not so these days. Dealers are getting more work into their shops than ever and this of course, points to the use of those cars the rest of the year.

Henry P. Epstein, president of the Garfield Motor Sales Co., Haynes and Oakland dealer at 49 E. Garfield blvd., reports the sale of touring cars with winter tops as phenomenal. "They have surpassed anything that I had thought of," he says.

The Staver Co., manufacturers of all kinds of winter tops, have been flooded with orders from all parts of the north and are over a month behind now with additional orders still pouring in.

Barring future rail and coal trouble, this fall and winter will be the biggest on record, is the view of most dealers.

60 DAYS' COAL IN INDIANAPOLIS

INDIANAPOLIS, Aug. 31—Automotive manufacturers of Indianapolis have coal and power supplies that will last for at least 60 to 90 days, with coal on the way to producing companies and to the public utility power companies which supply most of the power used by the automotive manufacturers. The public utility companies are well supplied with fuel and there is no apprehension in any quarter that a lack of coal will bring about curtailment of power.

OIL TO SUBSTITUTE FOR COAL

OMAHA, Neb., Sept. 1—The local assembly plant of the Ford Motor Co., is being equipped to burn oil instead of coal. Manager Russel said that his plant would continue to put out 168 cars a day as long as the material holds out.

Past Week Is Best in Milwaukee for Everyone

Both Dealers and Distributors Enjoy Greatest Selling Time

MILWAUKEE, Wis., Sept. 4—The past week was one of the best this year regarding both distributors' and dealers' business in Milwaukee. This was due to the genuine stimulation of the big motor show in conjunction with the annual Wisconsin State Fair, held in West Allis, a suburb of Milwaukee. Hundreds of dealers from all parts of Wisconsin and Upper Michigan, the Milwaukee distributing territory, came to Milwaukee, many of them bringing prospects who desired to see the 1923 models before placing orders. Local buyers who have been waiting to view the field before placing orders found opportunity of ample dimensions at the State Fair show to see practically every passenger car built in America in its new types.

Motor truck business likewise was helped along by the comprehensive display of commercial vehicles, which again took the form of a little village, called "Trucktown," as in the last two years.

The results of this year's State Fair show were eminently satisfactory, especially as it appears that the farmers are again becoming a buying factor, both in passenger and commercial cars. Exhibitors of farm machinery said that tractors and power operating equipment aroused more interest than in 1920 or 1921, and some actual sales were made on the grounds.

Upstate dealers said that there was a slowing up in demand in cities, but rural districts were producing some good business in passenger cars especially.

NEW OAKLAND MODELS

DETROIT, Sept. 1—Oakland 1923 models are now out with many body changes and some minor mechanical alterations, including new Marvel carbureter, new exhaust heated manifold with temperature control by throttle and new Remy distributer with semi-automatic advance inclosed in breaker box instead of moving distributer head. The gear shift levers are longer and levers for spark and throttle control instead of the usual quadrant are mounted on the steering column.

The bodies are deeper, with crowned fenders wider and heavier than formerly. The running board has been lowered an inch and a half. All models now are fitted with drum type headlamps. The sedans and coupes are fitted with heaters and rear view mirrors. The sport model is now more completely equipped and better upholstered.

Prices range from $975 to $1545.

AUGUST WAS MOON'S BEST MONTH

ST. LOUIS, Sept. 2—August was the best sales month in the history of the Moon Motor Car Co., shipments for that month having exceeded those for July, the previous high month, by 25 per cent. Officials of the company take this as an indication that the automobile business is being stabilized as an all year business. The company notes some slowing up of business in the west and southwest, which it attributes to the railway shopmen's strike, but sales in the east have not been affected. Orders for enclosed cars are said to be sufficient to keep the factory busy until December.

FEDERAL RESERVE REPORTS

WASHINGTON, Aug. 31—Reviewing general business and financial conditions throughout the several Federal reserve districts for the month of August, the Federal Reserve Board has found that manufacturing activity in the automobile industry is one of the bright spots of the industrial situation. The fact that the activity is still far in excess of a year ago, despite seasonal recession, is taken as an encouraging sign.

REORGANIZING HOLMES COMPANY

CANTON, O., Aug. 31—Plans for reorganization and refinancing the Holmes Automobile Co., are being worked out by a committee consisting of Ed. Langenbach, chairman, Norman C. Raff, Charles A. Kolp, William T. Kuhns, R. V. Mitchell, I. M. Taggart and Raymond Loichot. A meeting of stockholders and others interested will be held preliminary to the stockholders' meeting to be held on Sept. 6 when final plans will be consumated.

In connection with the refinancing and reorganization plan, another announcement of special interest made during the past week was that the Holmes company has completed a new four cylinder air cooled car which has been developed by the company during the past year under the direction of Thomas M. Kearney. It is expected that the car will sell for approximately $1,200.

STEWART-WARNER CALLS BONDS

CHICAGO, Sept. 1—Stewart-Warner Speedometer Corp. has called for redemption Sept. 1 at par and a premium of 4 per cent and accrued interest all of the outstanding five year 8 per cent convertible bonds, which total $1,667,000.

Parts and Accessories Makers Orders Booked Well Ahead

Indications Point to Continuance of Good Future Business

NEW YORK, Aug. 31—That automobile manufacturers are figuring on maintaining their record breaking production pace well into the fall is indicated by a survey of the parts and accessories field, which is a good barometer of the immediate future.

This survey shows that not only are the parts makers well booked with orders and specifications up to Jan. 1, and some of them beyond that, but that within the last two weeks some twelve or fifteen of the larger concerns have had their orders materially increased, which would indicate that their customers are not anticipating reduction of output. Indeed, from other channels it is learned that September promises to be a bumper month.

The parts makers' orders indicate that the run right now is largely in enclosed cars in the medium price class, which is a seasonal reason why production should continue the way it is. Some think, though, that the car makers, figuring on strike complications, are stocking their parts bins as heavily as possible at the present time so as to be prepared for the worst. Parts makers are feeling the crimp of the rail strike. Shipments have been hampered and steel is hard to get because the mills are not producing much material. Still most of the parts makers are running their plants to capacity and are feeling jubilant.

There have been few cancellations of orders and business conditions generally are good, although collections have slowed up somewhat.

RECEIVER FOR READING STANDARD COMPANY

READING, Pa., Aug. 31—A receiver for the Reading Standard Co., manufacturing the Reading Standard motorcycle has been appointed.

Bent and Broken But Still Running, American Made Car Makes New Record in Russia

WASHINGTON, Sept. 2—Reports received by the American Relief show that for the first time an automobile has won passage across the great Kalmuck sand steppes of southern Russia, incidentally achieving a new motor record in the service of humanity.

John A. Foy, Chief Inspector for the Tzaritzin district, limped back from a long and dangerous trip in a little old car that looked and sounded like an oilcloth covered, empty kerosene can on wheels, tied together here and there with anything handy. This doughty little insult to the human eye had done what the best make of car has repeatedly failed in. While enabling Foy to be of service to some hundreds of thousands of hungry children, it had made a new record, even for that hardy little buzz-cart whose first name is flivver.

Its front spring had broken, and Foy had to buy a Russian vehicle, to get another. Its main bearings disappeared, and he made others for it from a lead pipe he got in the sink of an old house. Its rear tires were punctured, and he ran the last 250 versts, with tires filled with sand, an excellent substitute, according to Foy. The clutch band broke, and he put a marine belt in its place. At last, his grease all gone, he came the last few miles with lard in the engine.

Map Shows Where They "Ask 'Em to Buy"

700 Meetings Have Been Held and 50,000 Persons Have Heard A. E. A.'s Sales Story

CHICAGO, Sept. 1—This is a pictorial story of the merchandising movement of the Automotive Equipment Assn. during the first year of its work. Each pin in the map on the wall of the office of Merchandising Director Ray W. Sherman at 1818 City Hall Square Building, Chicago, means that a meeting was held, the "Ask 'Em to Buy" story told and in most cases the "Ask 'Em to Buy" moving picture shown to an audience of dealers. Sometimes there were five in the audience, once there were 1700, several times there were 500 and th average is about 70

Fifty thousand people in the trade attended these meetings, of which there were 700 and hundreds of dealers through these meetings are making more money. Most of the meetings were held by jobbers in the territories served.

During the second year of the work the "Ask 'Em to Buy" moving picture story of Dan Morgan's rise to financial success will be supplemented by another picture which is entitled, "Shop Profits." Dealers in any section who want to see these pictures may have them by asking the jobbing house with which they deal. Ask the salesman who calls on you, and don't forget to ask him about the A. E. A. books, "A Greater Business" and "Shop Profits," which tell how dealers and garagemen may make more money.

The idea behind the movement is well expressed in the title in one of the moving pictures:

"Our industry can grow only as the dealer first makes profits."

REIMPORTATION TARIFF URGED

WASHINGTON, Aug. 31—Every effort will be made by the automobile industry to have the House conferees accept the Senate amendment to the tariff bill, providing for the imposition of a 90 per cent ad valorem duty on the re-importation of all motor vehicles sold to the American Expeditionary forces and the allied governments. The amendment will encompass the purposes of the so-called Graham Bill which has been pending in the Senate for several months and will give the much needed protection of automotive manufacturers and dealers.

CIVILITY CAMPAIGN RECEIVED

NEW YORK, Sept. 1—Excellent response has come to the campaign of the Motor Truck Committee of the National Automobile Chamber of Commerce for "Common Sense on the Highway," which was inaugurated several weeks ago. Already 125,000 copies of the pamphlet explaining the purposes and methods of the campaign have been distributed among truck manufacturers, dealers and fleet operators to be placed in the hands of drivers. It is believed that the campaign will result in a noticeable increase in civility among truck drivers.

DEALER HAS TRUCK SHOW

NEWARK, N. J., Sept. 2—The New Jersey Auto Co. is staging a truck and body show, which opened last week with a parade of 30 cars and trucks through the principal streets. Invitations have been sent to prospects and to the general public through the newspapers. Twenty-four types of bodies are on display and are mounted on light and one-ton chasses. The show is being held at the New Jersey company's show rooms at Central avenue and Hoyt street.

MORE TRUCKS FOR STEAM LINES

SPRINGFIELD, O., Aug. 31—An order has been received for additional motor driven trucks for steam line service, according to announcement of General Manager F. H. Pietsch, of The Kelly-Springfield Motor Truck Co. Although business slowed up in August, prospects for the future are encouraging, if the strikes are settled, Pietsch says.

JERSEY CITY SHOW NOV. 11-18

NEW YORK, Sept. 1—At a meeting of the executive committee of the Hudson County Automobile Trade Association, it was announced that the dates for the third annual show of the organization would be Nov. 11 to 18, and that the display would be held as usual in the Fourth Regiment Armory, Jersey City.

BANKRUPTCY PETITION FOR MASTER

CHICAGO, Sept. 2—A petition in bankruptcy has been filed against the Master Trucks, Inc., Chicago, by the Maremont Mfg. Co., Up-to-Date Machine Co., and the Auto Body Co., all of Chicago.

Gesas, Epstein & Leonard, attorneys for the petitioners, claim that the Master Trucks made preference to creditors by favoring the Vacuum Oil Co., with a payment of $500 about a month ago.

Disappointment Expressed at Report of Oil Committee

WASHINGTON, Aug. 31—Considerable disappointment has been expressed over the preliminary report of Senator McNary from the sub-committee of the Committee on Manufacturers, relative to the prices in the oil industry. It was expected that the committee would express an opinion as to the price changes in gasoline and other oil products. The Committee stated that the full significance of the price changes are reserved for further consideration and report after the answers to all questionnaires have been received and considered and the necessary witnesses called and examined.

The report deals with data prepared by governmental agencies and supplemented by reports from various refiners. The committee called attention to the fact that there is a distinct tendency of the stocks to accumulate in a comparatively few hands. As to the future supply of gasoline the sub-committee said "Any estimate of the length of time an existing supply of gasoline will last is of little use unless the supply of crude oil at the same period is also taken into consideration." The committee points out that it has not so far formed any opinion upon the controverted matters submitted to it.

MONTREAL TO HAVE SALON

MONTREAL, Que., Sept. 1—The recent announcement by Adelstan Levesque, active secretary of the Montreal Automobile Trade Association, that the directors of that association had decided to hold a Montreal Enclosed Car Salon early this fall, has aroused great interest among local motorists.

Present Coal Situation Most Serious to Cleveland Industry

No Immediate Danger of Shutting Down; Electricity and Oil Ready to Substitute

CLEVELAND, Sept. 2—Cleveland automobile manufacturers and parts makers regard the coal situation at the present time as most serious to the industry of the city, but none interviewed are in immediate danger of shutting down on account of lack of fuel.

In many instances purchasing agents took their cues last spring and went into the market and purchased supplies for the entire year and had it delivered before transportation became a problem.

Others have purchased electric power from the Cleveland Electric Illuminating Co., as a means for dodging trouble that comes periodically through labor troubles in the coal mining industry and in transportation.

Still others laid in big supplies of fuel oil and have burners installed ready for use, should coal give out.

In the plants that have electric power and fuel oil burners the only trouble possible to come from the coal situation is failure to obtain sufficient coal to heat plants, but that is considered generally a remote possibility.

The situation thus outlined applies to those manufacturers who are big and strong financially and were able to buy coal early and to change over to other sources of fuel. There are smaller concerns that have limited supplies of coal, from two weeks to a month, on hand, that will be forced to shut down unless relief comes.

"MADE-IN-ATLANTA" EXPOSITION

ATLANTA, Ga., Sept. 4—The automobile and tire manufacturing industries of Atlanta will be among those featured at the "Made-in-Atlanta" Exposition to be held at the Atlanta Auditorium Sept. 18 to 25. A number of the Atlanta factories will operate miniature plants as an educational feature. The Hanson Motor Co. will assemble a complete car from the separate parts twice each day, these to be regular stock cars for the company's Atlanta retail department. The Doss Tire & Rubber Co. will illustrate the manufacture of cord tires, both by hand and machinery, operating a miniature plant showing every process from the raw rubber to the finished tire. Virgil W. Shepard, manager of the Southern Automobile Show, is also manager of the "Made-in-Atlanta" Exposition.

2500 TRUCKS ON ALABAMA FARMS

MONTGOMERY, Ala., Sept. 2—According to a survey recently made by the markets division of the State Department of Agriculture, in co-operation with county agents and power equipment dealers, there are now approximately 2500 motor trucks in use on Alabama farms, and 1500 tractors, an increase of almost 100 per cent over the census of 1920, in spite of the fact that the farming industry has passed through a period of financial depression since that time. The census included only such vehicles as are actually in agricultural work.

Tractor and truck distributors in Atlanta covering the southeastern territory state that a similar survey in other states of the section would also indicate about the same increases as in Alabama.

Dealers Get Instruction in Use of Farm Tractor

MOLINE, Ill., Aug. 31—Field instruction in the operation of tractors has been commenced here by the John Deere Co. The Einfeldt farm near here has been selected for the demonstration. During the first week of August, distributors from Wisconsin were called in and at intervals during the remainder of the summer and fall, those from other states will assemble. The dealers are quartered at the farm and there is enough recreation to keep away monotony. By means of this practical instruction in the field, the various dealers will be in a better position to sell tractors and also service them after they are sold. Ralph Lourie and W. A. Gilmore are in charge of the school. Iowa dealers follow the Wisconsin. Five weeks have been allotted to this unique course.

GOOD BUSINESS HERE

PHILADELPHIA, Aug. 31—Automobile distributors continued to do a good business, the past week, with prices still on a decline.

Accessory dealers, in the main, report trade as spotty as ever, with collections poor. There is no change in the truck situation.

Yellow Cabs to Be Seen in London and Paris

CHICAGO, Sept. 1—Announcement of the organization in London and Paris of taxicab companies to operate cabs manufactured by the Yellow Cab Co. of Chicago was made here by John Hertz, president of the Yellow Cab Mfg. Co., upon his return from a tour of England and Continental Europe.

Hertz said the London and Paris companies placed orders for 25 cabs each to begin their service. Shipment of these cabs is to begin shortly. The prospective manager of the Paris company is on his way to Chicago to become associated for a time with the Yellow Cab Co. of Chicago to learn the principles of operation which have been largely responsible for the amazing growth of Yellow cab service in Chicago and other cities.

Hertz said the Yellow cab service in the two European capitals would be far superior to anything they now have and he believes the vehicles will become so popular that the service will grow rapidly and provide a constant foreign market for Yellow cab products. He said the Chicago company can manufacture the cars and deliver them in Europe much cheaper than they can be produced there and that his company has no intention of establishing a European factory.

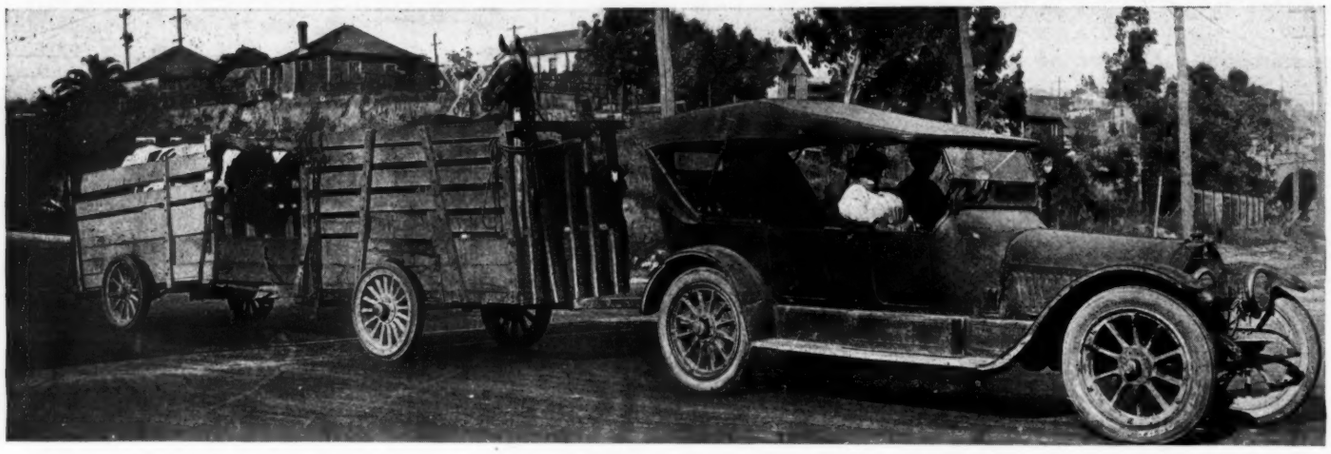
MEMPHIS TO HAVE SHOW

MEMPHIS, Tenn., Aug. 31—An automobile show will be given in the automobile show building at the Tri-State Fair Grounds here, Sept. 23 to 30, inclusive, under the auspices of the Memphis Automobile Dealers' Association. The show committee is composed of Thomas H. Smart, chairman, Fred M. White, Jr., and H. W. Osoinach, secretary.

Conference of Franklin Traveling Service Men

SYRACUSE, N. Y., Sept. 1—Traveling service representatives of the Franklin Automobile Co., attended a conference at the factory here, lasting a week, under the direction of F. J. Leyerle. The purpose was to thoroughly familiarize the men with the new Series 10 Franklin engine. The photograph shows the instructor explaining the details of the engine.

"Full Service From Their Car"



LOS ANGELES, Aug. 29—When Mr. and Mrs. Grannige moved from Artesia, Cal., they thought it best to take their valuable live stock along with them. As they owned an automobile, it was an easy matter to rig up the trailer shown in the photograph and hitch it on behind their passenger car.

The good roads with which California abounds simplified their problem. The photograph shows them passing through Los Angeles.

Some Improvement In Texas Business Noted

DALLAS, Tex., Aug. 31—There appeared to be some improvement in the automotive business in Texas during July and the first half of August. Dallas retailers reported increased sales of cars and trucks, and accessory men said their business was holding its own. The general tire trade was some better, but competition was keener and while the dealers in the city—regular dealers—were about holding their own they said the reason for their not showing an actual increase in sales was due to the fact that hardware men, grocery men, garagemen, accessory men and many other merchants are now handling tires as a side line and that every little store in the surrounding towns carries tires in stock at prices around what they could be handled for at the regular tire dealer's house. This has had a tendency to reduce the sales of the legitimate dealers, but not the sales of tires or the prices.

Fort Worth auto dealers reported business improved some ten per cent and Houston and South Texas dealers said business was steady.

The outlook is regarded as better. The cotton crop is now beginning to reach the market and the grain is moving. Automobile dealers say they expect September and October to be among the best months of the year.

Tractor sales showed some increase and sales of trailers were picking up.

BANKHEAD TOURIST SERVICE

BIRMINGHAM, Ala., Sept. 1—The headquarters of the Bankhead National Highway Assn, is receiving many inquiries from tourist bureaus in the north and east, as well as tourists, inquiring as to the number of camping grounds and automobile stations along the Bankhead Highway.

In order to give the desired information in regard to these camps, Director General J. A. Rountree has written to every Automobile Club, Chamber of Commerce and commercial organization in all of the towns along the Bankhead Highway from Washington, D. C. to San Diego, Cal., a distance of 3690 miles, to secure information in regard to these camps, so that it can be printed in pamphlet form and in the official organ of the Association, the United States Good Roads Bulletin.

KISSEL ADDING TO FACTORY

HARTFORD, Wis., Aug. 31—The Kissel Motor Car Co. of Hartford, Wis., has started construction work involving $100,000 on a large power plant and boiler house which will supplant its present heat and power generating system. Three 300-hp. Sterling boilers will be installed, together with additional dynamos, generators and other equipment. The Kissel plant also is undergoing general improvement and enlargement, the present construction including new dry kilns and lumber curing facilities for the woodworking and body hops, where all Kissel passenger car and motor truck bodies are built.

CADILLAC'S TWENTIETH BIRTHDAY

DETROIT, Sept. 2—In celebration of its 20th birthday as a producer of Cadillac cars, the Cadillac Motor Car Co. has purchased for itself, as a birthday present, a little one-cylinder Cadillac automobile, built in 1902. The Cadillac organization is 27 years old and began building cars in 1899, but did not take the name of Cadillac until 1902.

The ancient one-lunger chug-chugged its way up to the new 49-acre plant of the Cadillac company in Detroit, the other day, without faltering. President H. H. Rice took the grandfather of Type 61 out for a spin, and returned pronouncing the old car as "fit as a fiddle."

The model A "Caddie" has a curved hood concealing the water tank, a chain drive, and a motor amidships. It cranks from the side.

30,000,000 Automobiles in 15 Years, Says William Holler

BUFFALO, Sept. 2—Within 15 years there will be 30,000,000 automobiles in the United States, it was predicted by William Holler in an address before the Kiwanis Club. Holler, who is secretary of the Flint, Mich., Chamber of Commerce, said there is no truth in statements that the automobile industry has reached the saturation point.

"There are now 10,800,000 automobiles in this country," he asserted. Within 15 years this number will be trebled.

"Machines will be built to sell for $150 and $175. They will be made of wood and papier mache. A new fuel will have to be found and frictionless metal which will make the use of oil unnecessary.

"The time is coming when every laborer will have his car. Machines that have outlived their usefulness will be given to children instead of being junked."

82 EXHIBITORS AT INDIANAPOLIS

INDIANAPOLIS, Aug. 31—The State Fair automobile show of the Indianapolis Automobile Trade Assn. to be held Sept. 4 to 9 will have 82 exhibitors whose displays will fill the great Manufacturers Building of the State Fair Grounds. Thirty-five dealers and distributors of cars and vehicles showing 51 makes of cars have taken space, as have seven manufacturers and dealers in bodies, and 40 accessory manufacturers and jobbers. Bigger exhibits than ever will mark this fall show. The passenger car dealers and distributors who are to show have, in almost every case, increased the amount of space they took in former years. To a man, they expect bigger fall business to come from this state fair show than it has brought in recent years. The tendency of the great to grow larger and the well distributed wholesaler to get more and more business is well known in the approaching exhibit.

Cleveland Men Optimistic Over Enclosed Car Outlook

Barring Further Strike Interference, Sales Should Establish New Mark

CLEVELAND, Sept. 2—The fall of 1922 will be the banner season in Cleveland for sales of enclosed cars. Manufacturers, wholesalers, and retailers unite in saying that unless strikes interfere they will sell more enclosed models in September, October, November and December, than they ever before sold in the corresponding months. Men in the industry do not expect labor disturbances to upset their plans. They look for the situation to be cleared shortly.

The fact that the spring and summer months of the present year have been unexpectedly good for the enclosed models has convinced leaders in the industry here that this type of car is growing in popularity and that they offer the greatest possibility for sales development. The fall is regarded as the psychological time to make a drive.

That the entire industry in Cleveland believes this is evidenced by the co-operation that is being given the Cleveland Automobile Manufacturers and Dealers' Association in its activities on behalf of the enclosed car show, which will be held in the new $8,000,000 Municipal Auditorium Sept. 18-28 in connection with the style show and exposition of local merchants and manufacturers. Every Cleveland manufacturer and practically every distributor and retailer of a closed car is represented in the 41 allotments of space in the exhibit that have been made by Secretary Herbert Buckman, of the association who is show manager.

The publicity, the good will, and the driving power that the combined efforts of dealers and manufacturers will place behind enclosed car sales campaigns, coupled with refinements in cars and moderate prices for them are relied on to make this year a record one for sales.

Sales slowed up in Cleveland retail stores during August and production went down in factories as a rule, although there is an exception here and there. The let-up was slight, however. The month was much better than August, 1922, however. Price reductions are said to have helped on the whole, although some dealers say the break in quotations had the opposite effect. They are mostly distributors whose prices were not cut. All agree that prices should be stabilized quickly.

STUTZ ADDS SPEEDWAY ROADSTER

INDIANAPOLIS, Aug. 31—An addition to the Stutz line has been made in the shape of the Speedway roadster, a sport model which will list at $2760. It will be powered with the Stutz D-H motor and carry special compensating spring suspension. Equipment is the feature of the newcomer, one of the new things being a circular trunk which fits into a specially designed well in the rear deck of the car. The trunk holds two large suitcases. In addition to headlamps and spotlight, the roadster is provided with two small cowl lights and a parking lamp mounted on the left rear fender.

Two extra wheels, fitted with cord tires and shielded from the weather by moleskin covers carrying the Stutz crest, are furnished. Other conveniences are the heavy double bar bumper, plate glass side windshields, adjustable cowl ventilator, automatic windshield cleaner, rear view mirror and individual scuff and step plates.

Must Have "7" in License Number

PHILADELPHIA, Aug. 31—Gov. Sproul won't have a car license unless the number 7 appears conspicuously in it. He recently purchased a new automobile and the license tag issued to him was No. 700,000. His five other cars are numbered respectively 7, 77, 777, 7,777, and 77,777.

VIRGINIA "STOP" LAW

RICHMOND, Va., Aug. 31—Motorists entering Virginia should be given a general warning of a new law requiring all automobiles to come to a dead stop before crossing car tracks. Unless this is done it will be found that in many counties justices of the peace lay themselves in concealment along the road and pounce upon the motorist after he crosses the tracks, causing his arrest on the spot. This practice has originated and become an abuse because of the fee system, some justices making $100 a day at "fat" crossings.

TEXANS STRESS ETHICS CODE

DALLAS, Tex., Sept. 1—The Texas Automobile Association is enforcing a strict code of ethics. The association has set out to impress upon the automobile buying public of Texas that when they deal with a member of the association they are assured of a square deal, according to W. A. Williamson, manager. Williamson declared that no firm which fails to live up to the ideals of the association will be continued as a member. He said the association intends to make this so apparent that no firm will countenance a shady transaction. Eventually the members of the association will have to make good claims of customers made when sales were concluded.

EXCISE TAXES FALL OFF

WASHINGTON, Aug. 31—Preliminary statements by the Collector of Internal Revenue shows that the payment of excise taxes for the automobile industry, fell off by approximately $11,000,000 during the last fiscal year. The report shows that the excise taxes on automobiles for the fiscal year of 1922 amounted to $104,430,163.93, as compared with $115,546,249.31, for the fiscal year of 1921.

Motor Truck Will Replace Railroad If Necessary, White

N. A. C. C. Official Declares Trucks Will Do the Work If Strike Continues

CLEVELAND, Aug. 31—Windsor T. White, chairman of the Motor Truck Committee of the National Automobile Chamber of Commerce, and local manufacturer of trucks, in a public statement declares that the large cities of the country will not suffer on account of food shortage and other basic supplies if the railroads should be tied up by a strike.

While the special function of the motor truck is for short hauling and as a feeder to the railroad lines, yet in special emergencies it can be extended to cover the special situation.

Surveys just completed in New York, Baltimore, Boston, Philadelphia, Cleveland, Detroit, Kansas City, Indianapolis, Louisville, Omaha and New Orleans show that adequate supplies of food can be furnished each city in the event of a tie-up of railroads.

The post office department is now preparing to move all first class and paper mail with a fleet of 28,000 trucks. Service already has been inaugurated in Indiana. In another place 95¾ ton trucks operated by 152 letter carriers and 17 carriers on foot have superseded 240 horse-drawn wagons driven by an equal number of carriers at a saving of over $30,000.

Medicinal supplies and other drug necessities will not be stopped by a strike. The Louis K. Liggett Company, for instance, has for some time operated a large fleet of trucks in Connecticut, and New Jersey, and New York.

The Standard Oil Co., of New Jersey, is transporting barrel package goods from its refineries to its warehouses by truck.

The meat packing industry will not be materially affected. As an instances of what can be done 2,500 head of hogs are hauled daily by trucks into the St. Joseph, Mo. stockyards. Fifteen motor express lines for handling live stock shipments within a radius of 45 miles of Kansas City have been in operation for some time.

Trucks operating out of Louisville soon will be handling 500 tons of supplies on each outbound and inbound trip.

GROWTH OF ELECTRICAL SERVICE

DETROIT, Aug. 31—The Automotive Electrical Service Association, composed of electrical service stations in various parts of the country, has built its membership from 62 to 250 during the past year, according to reports read at a meeting of the board of governors here. The governors discussed plans for furthering the work of the association whose object is to make specialized electrical service work available both for dealers and owners.

Chicago's Transportation Would Be Aided By Bus

Aldermen, Returning from Europe, Praise Busses and Boost Subway

CHICAGO, Sept. 2—What to do about Chicago's transportation problem? The wise ones say a subway, the mayor says city ownership, the traction men say nothing and the automobile men are agreed on two things—a subway and a bus service which will reach all parts of the city.

The street car strike, which lasted for six days, did not seriously affect any one, except the department stores, because automobiles stepped out and saved the day. On the day the street car men returned to work Mayor Thompson asked for $3,000,000 for busses to be owned and operated by the city on a five-cent fare basis.

Mayor Thompson believes in a subway, but what are the people to do for adequate transportation between now and the time we are blessed with this subway? Should it cost seven cents to travel from one end of this city to another when it takes over an hour and a half to make the trip on lines that do not run through the loop and very near half an hour more on Clark street, one of the through route lines that passes through the crowded railroad and downtown district?

Maintenance of the street cars and their right of way undoubtedly costs a good deal, and though there have been no figures compiled, it is thought that motor busses can do the work cheaper and faster.

A delegation of aldermen recently went on a transportation problem-solving jaunt to Europe. They have returned with words of praise for all European bus systems and strong for the subway. Long ago they knew that busses were needed in Chicago, not to replace street cars, but to help them.

That the Chicago Elevated Lines believe in the motor bus is proven by the fact that they recently arranged to put fourteen into operation as feeders to their lines and that they are contemplating adding 26 more to this number.

Automobile men here who have studied the possibility of a bigger bus service are universal in the opinion that without them the transportation problem is as completely unsolved as ever.

Chicago is already overcrowded, it needs more room, both for people to live in and for men to make things in, but now workers are crowded right to the very doors of their factories because if they move out where their children can live like children they cannot get to their places of employment.

The transportation problem does not stay the same in Chicago—it grows worse each hour, and while the aldermen were over in Europe trying out the upholstered and plain busses of London and Paris a small body of automobile men here was at work on the real solution of the transportation problem—the motor bus.

It is interesting to note that the busses which went into operation here when the strike was called are still operating and it is easily seen how successful they have been when one of the suburban bus lines has sent in seven more busses since the strike to do duty on Chicago's streets.

Pacific Coast Dealers Consider Water Shipment to Avoid High Freight Charges

Oregon Association Asserts Far Northwestern States Are at Disadvantage Because of Lower Rates to California Points

PORTLAND, Ore., Sept. 1—As a step to cut down the heavy freight rate charged by the railroads on automobiles into the Pacific northwest, a rate which naturally brings the retail price on an automobile sold in Portland and elsewhere in this section to a higher figure than perhaps any other point in the United States, dealers are considering securing automobiles by water through the Panama canal, and this practice may be put into execution this fall by a considerable number of the dealers.

The Automobile Dealers' Association of Portland, through its secretary, Ralph J. Staehli, has for the past month been gathering data relative to water shipments of automobiles and has reached the conclusion that a substantial saving can be made in this manner, which can be passed on to the ultimate purchaser.

"Owing to the fact that the railroads coming into Oregon charge for a higher carload minimum than for California," Staehli said, "the Pacific northwest bears freight rates on automobiles in many instances considerably higher than California, and in fact the highest in the country. There being no prospect of freight reduction, and the railroad situation being altogether unfavorable on account of strikes, the Portland dealers have been investigating water shipment and many of them are on the point of trying it out.

"Under the railway freight schedules the cost of cars, particularly enclosed models has been increased sometimes as much as 20 per cent. By shipping by water we believe that this can be considerably reduced. A saving of one-third of the freight charge would be possible, our investigations have disclosed."

The cars could be handled from the eastern and middle western factories to the Atlantic seaboard by rail or canal, it is stated, and then brought through the Panama canal to the Pacific coast. While such shipments would take a considerably longer time than by rail, this delay would not be such an undesirable factor during the fall, winter and early spring months, although dealers would no doubt resort to rail shipments during the spring and early summer rush of buying. Some of the smaller dealers and distributors may join together in shipments in order to have the cars come by water and secure the lower rate, it was stated.

MOON NET INCOME REPORT

NEW YORK, Aug. 31—Moon Motor Car Co., St. Louis, has filed with the New York Stock Exchange a report showing that its income account for the six months ended June 30, 1922, returns a net income of $236,655 after costs and expenses and taxes.

The Stock Exchange has approved the listing by the Moon company of 124,726 shares of capital stock without par value, with authority to add an additional 29,487 shares upon official notice that they have been sold to the public.

DETROIT ENCLOSED CAR SALON

DETROIT, Sept. 2—The Detroit Auto Dealers' Association will hold an enclosed car salon Oct. 17 to 21 in the General Motors Building.

HOUSING PROBLEM AT FLINT

DETROIT, Aug. 31—A review of the housing situation at Flint is causing some apprehension among factory executives and city officials in view of the increased operations of existing factories and the pending opening of several new plants. An investigation of manufacturing conditions shows that Buick is adding to its employes at the rate of 100 a day; Mason Motor Truck Co. and the Martin-Parry Corp. are about to open plants, Chevrolet declares that its force will be increased by about 3000 by next spring, and Durant building plans call for completion of the Flint factory by spring.

There is no unemployment in the city now and it is reported that all of the new help required will have to come from outside the city. There are less than 100 available dwellings reported, and many real estate agents report waiting lists of persons seeking homes in certain sections. Builders and real estate men estimate that between 4000 and 6000 homes will have to be built within two years.

STAR NEBRASKA STATE FAIR

OMAHA, Neb., Aug. 31—The Star car will be on display at the Nebraska State Fair at Lincoln, Sept. 3 to 8. Andrew Murphy & Son, Omaha distributors of the Durant will show two models and will promise to start making deliveries.

BUSINESS NOTES

Detroit Cadillac Motor Car Co., of New York, and the Drennan Motor Car Co., of Birmingham, Ala., Cadillac distributors, have recently purchased real estate adjoining their present plants and will build additions in the near future. A plot, 80 feet by 150 feet, on New York Post Road, comprises the new property of the New York company, while the Drennan company bought 50 feet east of its present home.

Lucas & Christenson, distributors of the Gardner line of cars in the Cleveland territory, have opened temporary sales and display rooms at 1812 and 1816 Euclid avenue. The quarters are just east of the former location that was ruined by fire a few days ago. On October 1 the old quarters at 1730 Euclid avenue will be ready for occupancy.

Royer-Brunner Co. has opened a Chevrolet sales and service station at 5909 Broadway, in Cleveland.

Cornell Sales Co. has been appointed distributor for the I. J. Cooper battery and battery parts, at Cleveland.

Bob Allen Overland Willys-Knight Sales Co., 2122 Euclid avenue, has been incorporated with a capital of $25,000.

Kankakee Tire and Service Co. has been organized at Kankakee, Ill., and has opened a maintenance station at 547 East Court street. Capital stock has been fixed at $25,000. The promoters include W. M. Cortlin, E. C. Peters and W. F. Krall.

Moses & Morris Corp. has been organized at Chicago Heights, Ill. A garage and maintenance station has been opened at the corner of Center and Seventeenth streets. Capital stock has been fixed at $5,000. A complete line of accessories will be carried. The founders of the company include F. O. Moses, Henry Moses, Milton Morris and L. W. Carrier.

Constant & Groves, Fifth and Edwards streets, Springfield, Ill., has been appointed distributor for the Hupmobile in Sangamon, Menard, Cass and Christian counties.

J. D. Farnsworth, for some time employed as mechanic at the Kenney, Ill., Motor Sales Co., has purchased the plant from Stoutenborough & Son, and will hereafter handle the business alone. He plans to carry a complete line of accessories and also a repair and storage business.

Work on the construction of a three-story concrete and brick structure for the Conduitt Automobile Co., of Indianapolis, distributor for the Peerless, Maxwell and Chalmers, began this week. The building is to stand at the corner of Meridian and St. Joseph streets; it is to be modern in every particular and will cost about $150,000. The site was leased on a 99-year lease with a valuation of $60,000.

The Kolbo Motor Co., Valley, Neb., has leased the building formerly occupied by Parson & Peterson and will operate an authorized Ford agency, carrying a complete line of Ford parts. Kolbo was a salesmanager for the Sample-Hart Motor Co. of Omaha.

The Marathon Tire Co., exclusive St. Louis distributors for the Marathon Tire & Rubber Co., has opened sales and maintenance quarters at the southeast corner of Channing and Locust streets with Henry L. Michelson as manager. The company will also distribute the Cornhusker tire. The new company is affiliated with the Ed. S. Michelson Co. of Kansas City, Mo.

The McQuiston-Shields Motor Car Co., organized by H. P. McQuiston and H. H. Shields, both of whom have had many years' experience in the used car field in St. Louis, has opened for business in the large two-story building at the northwest corner of Channing and Locust streets. The new company has arranged with finance companies for the selling of the cars they acquire in the course of their business.

The Inland Products Co., manufacturers of pistons, pins and piston rings, have opened a service station at 2835 Washington avenue, St. Louis. Kirk M. Roberts, district salesmanager, will be in charge assisted by A. G. Haberle and Horace Foote.

Delhi Battery and Supply Co., Presto Lite Battery distributors, which has been located in the building at the southwest corner of Beaumont and Locust streets, St. Louis, for several years, has moved to their new headquarters, 2317 Pine street.

The Dallmann Machinery & Mfg. Co., 935 Winnebago street, Milwaukee, has purchased the rights to the Smith sliding gear an clutch heretofore manufactured by the Smith Sliding Gear & Clutch Co., of North Lake, Wis. The Smith company will receive a royalty on the Dallman production. The North Lake works will concentrate on the manufacture of pullevs for Fordson tractors and similar mechanical devices.

The Tractor & Truck Improvement Co., of Merrill, Wis., which has been incorporated with $50,000 capital, will establish a plant for the manufacture of a new design of transmission invented and patented by Ross Koile of Merrill. It is an epicycle gear drive for which it is claimed that the lightest and cheapest tractor or truck now on the market can be made as efficient as the heavier and more expensive types.

The Oldfield Tire Co., Akron, O., has been granted a Wisconsin charter. A branch has been opened at 441-443 Jefferson street, Milwaukee. The capital stock is given as $50,000, and the proportion to be employed in Wisconsin as $10,000.

Chidester-Frint, Inc., 528-532 Broadway, Milwaukee, Wis., distributor of the Durant in Wisconsin and Upper Michigan, has been designated as distributor, in the same territory, of the new Star car.

The John G. Wollaeger Co., 417-421 Wells street, Milwaukee, state distributor of the Studebaker in Wisconsin, has opened a retail branch sales and service station at Kenilworth and Prospect avenues, Milwaukee, under the management of Charles H. Jackson. The Wollaeger Co. will move about Nov. 1 to its new $150,000 headquarters building at 2719-2723 Grand avenue, on the west side of Milwaukee, where it will also maintain a retail division besides its distributing house.

The Hartland (Wis.) Auto Supply Co. has been organized by John H. Pessin and opened for business in the Opera House block as a general dealer in automotive equipment, tires, accessories, etc.

Fond du Lac-Velie Motor Co. has been organized at Fond du Lac, Wis., by William Frank, formerly associated with the Huelsman-Dodge Co. of the same city.

The Schultz-Bray Auto Co., Evansville, Wis., has been incorporated with $15,000 capital stock to deal in new and used cars, automotive equipment, etc. The incorporators are William F. Schultz, John J. Bray and C. D. Schultz, all of Evansville.

Herbert Winkler and W. A. Brown, Florence, Wis., have been appointed joint dealers in the Oldsmobile in Florence county, Wis., and Iron county, Mich., which adjoin.

Fox River Motor Co., Green Bay, Wis., capital stock, $100,000, has been chartered to deal in motor cars, trucks, tractors, equipment, etc. The incorporators are Charles W. Collins, Lynn D. Joseph and E. M. Stenger.

Stanley Supply Co., Stanley, Wis., dealer in automotive equipment, tires, etc., is a new Gardner dealer.

The Robert Bosch Magneto Co., Inc., 123 West 64th street, New York, has established a direct branch office at 1302 South Wabash avenue, Chicago, Ill., with Lee C. Carlton as the executive head. This branch will take care of the business of the middle western section. It will carry a complete stock of Robert Bosch magnetos, spark plugs, spot lights, horns, etc., the same as the New York office.

A price reduction of "Off 'N On" tire chains has been announced by the manufacturers, the Pyrene Mfg. Co., of Newark, N. J.

Johnson Shock Absorber Co., 2613 S. Michigan avenue, Chicago, has acquired the manufacturing and sales rights for the Johnson shock absorbers, formerly controlled by the Temme Spring Corp. of Chicago.

By order of United States District Judge Bodina, at Trenton, N. J., the real and personal property of the Empire Tire & Rubber Corp. will be offered for public sale by the receivers, Arthur H. Woods and C. E. Murray, Jr., Sept. 13. All bids received then will be reported to the court on Oct. 2. Each bidder must file a certified check for $100,000 before the bid will be considered.

Following the death in an airplane accident recently of E. W. Schillo, president of the Schillo Motor Sales Co., Mercer and Templar distributors in Chicago, and Roy G. Keller, the company's mechanical superintendent, it is announced that the business will continue under the management of C. E. DeBolt, with Ed. Jencks as mechanical superintendent.

In the last two months the Piston Ring Co. of Muskegon, Mich., has produced 5,232,051 piston rings, according to an announcement by the company.

The Philadelphia office of the Morse Chain Co. has been moved to 612 Franklin Trust Building, 18-22 South 15th street. J. A. Meaney is district manager.

Mahan and Broadwell, architects, American Savings Bank Bldg., Memphis, Tenn., have prepared plans for a new building for the Interstate Automobile and Supply Co., recently incorporated in Memphis. The building will probably be located on Union avenue and work begin the latter part of the present year. The structure is very artistic and will cost about $40,000.

The Manhattan Electrical Supply Co., Inc., announces that the executive offices are now located at 125 Church street, New York City. J. J. Raftery, formerly of the Western Electric Co. and until recently with the Curtis Publishing Co., has been appointed manager of the New York branch, of which Howard N. Croop is salesmanager and C. H. Boehler is city salesmanager.

The Lefler Motor Car Co. has been organized and incorporated at Concord, N. C., to establish an automobile agency, by S. W. Lefler, H. C. Ridenhour and S. K. Patterson. Capital is $50,000.

E. G. Eidson, president of the Cyclone Motor Corp., Greenville, S. C., manufacturers of trucks, and Frank F. Leigh and J. B. Ricketts, have been named by the court as receivers for the company following a recent petition in bankruptcy filed by creditors.

New corporations recently formed in the automotive business in Illinois are listed here: Motorlife Mfg. Co., 115 S. Dearborn street, Chicago. Capital $100,000. Will manufacture and deal in compound called "Motorlife."

Roosevelt-Paulina Garage Co., 1733 W. Roosevelt Road, Chicago. Capital $4,000. Deal in and hire automobiles.

Many Sources Offer Safety Suggestions

"Seven Days for Safety" May Be October 8 to 14, Says Board

WASHINGTON, Sept. 2—Invitations to fifty representatives from each of seven groups concerned in highway safety are bringing a deluge of suggestions for incorporation in a national safety campaign planned to retard the accident and death toll of the country due to traffic mishaps, according to announcement by the Highway Education Board.

Almost without exception, replies indicate an eagerness for such a campaign, stressing the timeliness and need for a national movement of this nature. Groups requested to offer suggestions include pupils, teachers, superintendents of schools, automobile clubs, chambers of commerce, police officials and automobile dealer associations.

Outstanding suggestions received to date, it is said, include a national essay contest among all pupils doing class room work in the fifth to eighth grades, a national safety lesson contest among teachers, the observance of "Seven Days for Safety," and the distribution of "Pledges of Carefulness" among pedestrians and drivers alike. October 8 to 14 seems the date most favorably agreed upon for the observance of "Seven Days for Safety," according to the general tenor of the letters received.

Several weeks ago the National Automobile Chamber of Commerce offered to set aside approximately six thousand dollars in prizes for the best safety essays and lessons if sufficient interest was indicated. If the date of Oct. 8 to 14 is definitely fixed for the observance of "Seven Days for Safety," or "National Safety Week," it is expected that those in charge of local campaigns will arrange their dates to conform, and their activities to include the salient features.

CONCERNING MEN YOU KNOW

J. A. Clark, general manager of the Van Cortlandt Vehicle Corp., the New York distributor for the Peerless, announces the appointment of W. R. Chandler as retail sales manager of the New York factory branch. Chandler has been connected with the automobile industry for the past 12 years, having formerly been manager of the old Flanders Electric Co., vice-president and general manager of the Holt-Chandler Co., New York agent for the Maxwell and Pope-Hartford and general manager for the Hayes-Diefenderfer Co.

Robert C. Yates, well known in the forging industry and for many years identified with the Union Drop Forge Co., of Chicago, has resigned to become general manager of the Interstate Drop Forge Co. of Milwaukee.

B. G. Brennan has been appointed general salesmanager of the Inland Products Co., manufacturers of the Inland Spiral-Cut and Oilless piston rings.

King Motor Car Co., Detroit, announces the appointment of C. L. Graham as factory superintendent.

F. D. Cerk has been appointed general manager of the Stutz Chicago Co., distributor in Chicago of the Stutz car. Cerf came to Chicago from Memphis where he was for a number of years distributor of the Dodge car. For several years he has been manager of sales and advertising for Harris & Rodger of Chicago.

C. C. Weisong, formerly salesmanager for Joseph G. Blount, Maxwell and Chalmers distributors of Atlanta, has been appointed manager of the retail sales branch of the Hanson Motor Co. for the Atlanta territory.

John S. Shirley has been appointed advertising manager of the "X" Laboratories, manufacturers of "X" Liquid. He has been in the advertising field for the past 15 years; 12 years of which were spent with the Percival K. Frowert Co. of New York and Philadelphia, during which time he served as copy-writer, rate and plan executive, special account representative and general manager.

Oscar F. Ostby has been appointed general salesmanager of the Prest-O-Lite Co., Inc., to succeed C. C. Leininger, who resigned.

John A. White, a pioneer in the battery industry, has been appointed a vice-president of the U. S. Light & Heat Corp., manufacturers of USL storage batteries.

Robert Lurie, of 125 West 49th street, New York, has just taken the greater New York and Connecticut representation for the Kelsey friction-drive car. Lurie, up to 1918, was distributor for Metz.

J. F. Hundt, formerly district manager for the Wainwright Engineering Co., has joined the staff of the Globe Machine & Stamping Co., of Cleveland, and will represent it in a sales way in the west, while W. F. Edwards, the company's national sales representative, will look after the east in selling the Globe Motoright steering wheel lock, tool and battery boxes and stop signals.

Louis C. Steger, member of the board of directors and director of purchases and stores for S. F. Bowser & Co., Fort Wayne, Ind., died on Aug. 20.

J. V. Aguirre, manager of the export department of the Mason Tire & Rubber Co., Kent, O., recently returned from a five months' trip through Mexico, West Indies and all countries bordering on the Caribbean Sea.

Harold J. Throm has been named vice-president of the Buffalo (N. Y.) Oakland Motor Co., and T. B. Rautenberg has been appointed secretary and treasurer. R. L. Hedges, Jr., formerly secretary and treasurer, has returned to St. Louis.

George H. Hunt, formerly manager of Stromberg Motor Devices, and for the past three years salesmanager of the Disteel Wheel Corp., is now in charge of Rayfield carburetor sales to manufacturers of passenger cars and trucks. He has offices at 1401-7 David Whitney building, Detroit.

Thomas B. Toy, salesmanager of the Buffalo (N. Y.) Packard Co., died while visiting his son, Frederick Yale Toy, in Jamestown. Heart trouble caused death.

Alfred P. Sloan, Jr., vice-president of the General Motors Corp. in charge of operations, J. J. Raskob, vice-president and chairman of the finance committee, and Alfred H. Swayne, vice-president in charge of banking relations who have been abroad for the last seven weeks, returned last week on the Majestic.

Paul Smith, of the service department of the Maxwell-Chalmers Sales Corp., Philadelphia, piloted a large party of Maxwell-Chalmers employes to Port Norris, N. J., on a week-end fishing party. Thirty-three men went along.

Frank Talbott, who was formerly general manager of the Victor Rubber Co., Springfield, O., has been appointed general manager of the Virginia Rubber Co. with headquarters at Charleston, W. Va. Since leaving the Victor, Talbott has been directing the manufacture and sales end of a new tire he has invented. It is announced that the tire will be manufactured at the Virginia plant instead of at Cleveland.

Harold G. Pederson, for two years factory superintendent of the Kelsey Wheel Co., Windsor plant, has resigned to join the factory staff of the Franklin Automobile Co., as assistant to the master mechanic.

NO STRIKE HOLD-UP HERE

CHICAGO, Aug. 31—M. J. Lanahan, sales manager of the Dashiell Bros. Co., Dodge distributors, says that the rail strike has not as yet seriously affected the delivery of their car and that there are more than 400 orders on enclosed and open cars yet to be filled with sales still stepping along at a surprising rate.

More than 500 Buicks have reached Chicago over the Pere Marquette R. R. within the last two weeks. The Case Co. reports sales of enclosed used cars as phenomenal and other retail and wholesale establishments are "feeling fine" over the outlook for the fall and winter.

PEERLESS PRODUCTION SOLD

CLEVELAND, Sept. 1—The scheduled production of the new models of the Peerless Motor Co., has been sold for one year ending Aug. 1, 1923, according to an announcement made at the factory. The output was completely absorbed by distributors and dealers within 24 hours after the announcement of the new line was published.

R. H. Collins, president of the company, stated that the favorable public response exceeded his most optimistic expectations.

The reception of the car in this city was unexpected. On the day that the new cars were first put on display, the local Peerless sales room had more visitors than it ever had in any single day in its history. The sales exceeded all previous single day's records.

KISSEL EXPECTS BIG YEAR

CHICAGO, Sept. 2—The Kissel Motor Car Corp., according to G. A. Kissel, president of the company, is preparing for the biggest year in its history when the work for 1923 swings under way. At present, the Kissel is going strong in the sale of both open and enclosed cars and Kissel declared that this fall and winter ought to be a record-making period for all automobile concerns if the present strike situation does not grow worse.

Both Harry P. Branstetter, Chicago distributor for the Kissel, and the official of the firm are optimistic over the outlook for the automotive business in general, expressing the opinion, that sales should continue in rapid fire order right up to inventory time in the winter.

California State Automobile Assn. to Welcome Tourists

Maps and Information Service Is Offered by Northern Club

SAN FRANCISCO, Sept. 1—Every motor car party entering Northern California is to have an official welcome at the State Line and will be served with free maps, touring and traffic information under new policies adopted by the Board of Directors of the California State Automobile Association.

These policies were announced by President George S. Forderer at a meeting of Association department heads and branch managers held in San Francisco this week. They will be put into operation for the remainder of the present touring season and with the opening of the 1923 season the California State Automobile Association's welcome sign will have been erected at all points of ingress and egress to Northern California.

The Association will place at the State Line signs reading:

VISITING MOTORISTS
The California State Automobile Association is at your service during your stay in California.
Maps, State Registration Requirements, Traffic Laws and Road Information Supplied—Without Charge.

In announcing the new policy of the Association, President Forderer said:

"Visiting motorists annually spend millions of dollars in California. The expenditure of this money contributes much to the general prosperity of the state. One of the purposes of the organization is to promote motor tourist travel into California in order that these visitors may have the opportunity of becoming familiar with the great natural resources of the State, its industrial and commercial advantages, as well as its scenic glories. Their presence in increasing numbers each year is a benefit to each and every resident of the State. In the past, this organization has served only those visiting motorists who were supporting motor car organizations and has made a cost charge for its maps. We will now not only supply the visiting motorist with free maps, information as to state registration requirements, traffic laws and road data, but our sign system extended and improved as it is each year will insure them a pleasant stay in our State."

MARMON BOSTON CO.

BOSTON, Aug. 31—The Marmon Boston Co. has just been organized in this city to handle the Marmon line in the territory of eastern Massachusetts. While factory executives are officials of the new company, it is not a factory branch, being a Massachusetts corporation. Col. E. S. Gorrell is president and treasurer; A. R. Heiskell, vice-president, and Fred E. Moskovics, secretary.

IN THE RETAIL FIELD

McCreery-Phelan Co. announce their removal to their new home at 300-302 Monroe avenue, Memphis, Tenn., under erection for the last several months.

The building at 444 Monroe avenue, Memphis, Tenn., which has been occupied by the Cleveland Motor Car Co. until recently has been leased for five years by the Jerome P. Parker-Harris Co. and will be used by it for its used car department. The Parker-Harris company own the building at the northeast corner of Monroe and Lauderdale streets, which has been occupied by the Buick company factory branch and this adjoins the building at 444 Monroe and will be occupied by the part of business formerly on Madison. The company will have a frontage of about 130 feet on Monroe avenue, which is "Automobile Row" in Memphis.

Frank J. Ruggaber, proprietor Diamond Service & Auto Supply Co., Racine, Wis., is a voluntary bankrupt, with liabilities of $2,164 and assets of $4,532.

The Sheboygan (Wis.) Oiling & Greasing Station has been established at 841 North Seventh street by William Schmitt, Jr., to render lubrication service to private owners.

Reliable Service Co., Eau Claire, Wis., has been appointed Haynes dealer, with sales and service station in the Fisk building, Farwell and Eau Claire streets. The partners are Willard Enge and George Amentorp.

Jelinski Bros., North Fond du Lac, Wis., have opened for business their new garage and repair-shop, designated as the Arrow Garage, at Jefferson and Oshkosh streets. It is a new building, 40x120 ft., fireproof.

Stromer Garage, Gillett, Wis., was badly damaged by fire with a loss of $10,000, partly covered by insurance. It will be rebuilt and re-equipped.

The South Side Buick Co., Milwaukee, a new Buick dealer, has been incorporated with $20,000 capital stock by J. A. Piszczek, M. J. Czerwinski and F. S. Wasielewski.

Spring City Tire Co., 330 West Main street, Waukesha, Wis., has plans for a new public garage, sales and service building, 65x185 ft., one story and part basement. The business is owned and managed by Wolf Bros.

Ernest Heinemann, of Seymour, Wis., has leased the Krause garage at Antigo, Wis., formerly occupied by the Paige Motor Sales Co., and will open a general repair and service shop, specializing in welding, cutting and other expert processes.

Charles Jary, Medford, Wis., tire dealer and repairman, has sold the business to H. A. Fischer, of Madison, Wis., who took charge Aug. 15.

H. A. Brandenburg, Manitowoc, Wis., has opened for business in his new shop building at Fourteenth and Franklin streets, and is specializing in painting and trimmng passenger cars.

Jaeger-Dowling Co., Neenah, Wis., a new $50,000 garage and dealer corporation, has plans for a $25,000 sales and service building, 75x119 ft., to be erected at 120-124 East Wisconsin avenue, Neenah.

Motor Inn., Fond du Lac, Wis., has been established as a general service and repairshop by Paul A. Jaffke and Joseph G. Wagner. It is located at 17-19 South Macy street. Mr. Wagner was formerly associated with the Crescent Motor Car Co. and the Raymer Garage, Fond du Lac, as shop superintendent.

Tri-City Nash Co., Neenah, Wis., Nash dealer in Neenah, Menasha and Appleton, Wis., has admitted James F. Fritzen as a partner. The capital has been increased. Mr. Fritzen becomes vice-president and city sales manager. F. W. Abenschein is president, and George E. Sande, secretary-treasurer.

H. W. Johonnett & Son, formerly of Beaver Dam., Wis., have moved to Kenosha, Wis., to become Buick dealers.

Joseph P. Wergin, Kewaunee, Wis., proprietor of the Kewaunee Furniture Store, who has been manufacturing and repairing tops and cushions and doing motor car upholstery work on a small scale for some time past, is erecting an addition to his building and will establish this activity as a distinct department.

Rice and Norris Company, of Bangor, Me., distributors of the Packard for eastern Maine, including the city of Bangor and suburbs, have moved their salesroom and service station to Center street in Bangor.

Porter's Garage, French street, Bangor, Me., is a Ford service station and a stock of Ford parts has been secured.

Through an announcement of the Haynes Automobile Co., Kokomo, Ind., the Monmouth Auto and Tire Co., of Newport, Ky., and Harry Lampert, of Xenia, O., become dealers for Haynes cars in their respective territories. These two Haynes dealers will operate under the Jennings Motor Car Co., Haynes distributors, with headquarters at Cincinnati.

The Hannan-Odell-Van Brunt Motor Co., of Omaha, Neb., authorized Ford and Lincoln dealers, has started a monthly publication for Ford owners, entitled, "Ford Owners News." Volume 1, Number 1, is dated August, 1922.

Columbia-Westcott Co., Charlotte, N. C., has been organized here and has opened at Fourth and Poplar streets. The company will distribute Columbia and Westcott cars in both North and South Carolina. J. A. Cave is president; R. F. Willeford, vice-president; H. F. Rush, sales manager; C. A. Crater, treasurer.

Oldsmobile Sales and Service Co., Raleigh, N. C., has been organized here to distribute Oldsmobiles in the Raleigh territory. The company will take over the Norwood garage and in addition to the distribution of Oldsmobiles will continue the Norwood storage and service. C. E. Hanbury and R. E. Winstead compose the new firm.

Lifsey-Smith-Hill Co., 236 Peachtree street, Atlanta, announces their appointment as distributors throughout Georgia for the Peerless Motor Car Co.

Buchanan Motors Corp., another newcomer on "Automobile Row" in Louisville, Ky., have recently opened their salesroom at 653 South Third street. This company will distribute the Moon automobile in this territory, with J. A. Kauffmann in acitve charge of the organization.

The names of the incorporators of the Fox River Motor Car Co., Green Bay, Wis., were incorrectly stated in the MOTOR AGE of Aug. 24. The incorporators are Charles W. Collier, president; Josephine A. Collier, vice-president, and Arthur J. Geniesse, secretary. The company has been in business handling the Ford line 12 years under the management of Charles W. Collier.

W. G. Miller and W. A. Thompson, Springfield, Ill., have formed a partnership and organized the Standard Motor Service Company and opened a garage and sales agency at 223 East Monroe street. The firm will distribute the Oldsmobile line in the Sangamon county territory.

F. C. Daubs and H. F. Vishniski, both of Chicago, have formed a partnership and organized the Daubs-Vishniski Motor Car Company with headquarters at 131 North Walnut street, Danville, Ill. The company has been appointed distributor of the Buick car in the Vermilion county territory. The members of the firm have long been identified with the Buick organization in the Chicago branch. The sales station at Danville is a temporary one and in the near future the new company plans to erect its own building.

Haury Motor Co., Durant distributors for the Louisville, Ky., territory, has received a telegram from Carroll Downes, president of Star Motors, Inc., advising that they have been appointed to establish the Louisville branch of the Star Motor Co. of Kentucky, with complete charge of marketing the Star line of motor cars in their territory.

E. B. Strube, president of Strube's Garage, Louisville, Ky., has announced that since acquiring the distribution of the Lincoln and Ford line of motor cars the firm name has been changed to the Strube-Pettit Motor Co., with E. B. Strube as president and J. B. Pettit, vice-president, and E. H. Strube, secretary and treasurer. J. B. Pettit has been connected with Ford factory branches in Memphis, Nashville and San Antonio for the past eight years.

The Franklin Motor Car Co., of Bangor, Me., has been specializing in the sale of used cars lately. A mail order department has been opened in connection with the selling of used cars by this company.

Albert J. Howard Co., of Bangor, Me., with salesroom and service station for the Durant, represents the Durant in eastern Maine. The appointment was recently made and the company is now disposing of a stock of used cars to make room for the Durant models.

After the beginning of 1923 the Stoddard Motor Car Co., Lincoln and Ford distributors, Springfield, Mass., will be quartered in a new building of white marble construction opposite the Hotel Kimball. Plans now being drawn call for one of the finest automobile establishments in New England. Connected with the large show room will be a service station for the Ford exclusively, and there will be a complete line of Ford parts.

John B. Lyerly is acting as distributor for the Gray in Pittsfield, Mass. He also handles the Rickenbacker.

Bloomington Ford Day Is Big Incentive for Business

Many Owners Turn Out With Cars of All Sorts to Win Prizes

BLOOMINGTON, Ill., Sept. 4—An effective advertising idea was carried out on Saturday, Sept. 2, by Rue Motor Co., of this city, distributors of the Ford car. To stimulate business, which has been quiet since the railway strike, it was decided to ask the merchants of the city to co-operate for a Ford day, in which every car owner of that type be invited to attend a barbecue at Miller Park. The business men willingly responded and gave way numbered tickets during the week preceding, with every sale of fifty cents. The holder of the winning number was presented with a new Ford car by the Rue company. In addition, there were fifty other prizes given by the Rue company and the merchants, these going to the Ford owner who came from the most distant point; the Ford owner with the oldest car; the Ford owner with the largest family, etc. It was computed that there are 4,000 Ford cars in McLean county and territory directly adjacent and if all responded to the invitation, there would be a vast crowd to be entertained. While not this number of car owners came in, yet there was a tremendous response and the event was voted a great success by the promoters. H. Dale Rue, president of Rue company, gave a dinner to all of the motor car dealers of Bloomington one week prior to the event and invited all of them to take part and procure what advantage they could of the presence of this army of Ford owners. He believed that in this great number of visitors there would be many prospects for the higher priced cars and that Ford day might be of value to all of the dealers, and he hoped that each would find some profit in the assemblage. This exhibition of brotherly spirit was deeply appreciated by the dealers and all agreed to do what they could to make the day a great success. A beef barbecue dinner with free eats at Miller Park was a feature. Another was the parade of Ford cars, several miles in length. The finale was a program of athletic sports and the awarding of the prizes. All of the retail merchants profited by the event and there was a great army of purchasers in from the rural districts.

GOVERNMENT WANTS FILMS

WASHINGTON, Aug. 31—Morton F. Leopold, director of motion picture work, for the Department of Commerce is seeking to obtain from farm implement and tractor manufacturers films showing the way in which farm machinery is manufactured and how it operates in the field, with a view of having these films exhibited abroad by consular officers and other governmental agents.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Organization and Incorporation of an Accessory Business

Q—How can I organize and incorporate a wholesale and retail motor accessory business of say $5,000 capital, 100 shares at $50 a share? Would it all have to be paid in at once? How can I retain the management without owning fifty-one per cent? How can I arrange to buy the controlling interest later? Under what State would you incorporate? What would the incorporation cost?—R. G. Dean, Springfield, Mo.

A—Answers to your problem must be determined by the state selected as the home of the corporation. Since you are in Missouri the first preference should be given that state as you must largely conform to its requirements anyhow. But, among the most desirable states having corporation laws most favorable to incorporators, Delaware is perhaps the most commonly selected for organizing the corporation at the present time, displacing New Jersey which was the most popular state a decade ago.

In Delaware, a corporation may begin business with only a small part of the stock subscribed. Its fees are about the lowest of the states save Arizona, S. Dakota and perhaps Maine. But Delaware carries more prestige than Arizona among incorporators. There are companies that care for the meeting of incorporators (as by proxies) keep duplicate sets of books, stock records, etc., as required within the state. Stock may be given a par or left without par value.

Now for a small company, such as you purpose, there would not be a great difference in the corporation expense, when you figure the cost of the extra service in a distant state, between your own state and any other. Your own Secretary of State should be able to provide you with application blanks for the purpose of applying for a charter. First you should get your friends or incorporators to sign a subscription list to insure going through with the project.

No state requires all the capital to be paid in at once. Only a part may be required and payment of the balance is left to the discretion of the management or directors. But it is best business to have it paid as quickly as possible. Some companies keep the control by tieing up the 51 per cent of stock in a voting trust and issuing certificates instead of the stock. Majority stock does control, unless there is an agreement otherwise, as by pooling the stock as suggested. You might arrange to buy up the stock later by an agreement with the subscribers to that effect.

Organization under a declaration of trust would apparently be the best form for your purposes. Besides this form has many advantages, as it saves both expense and corporation reports. The entire affairs are put in the hands of the trustees or managers named in the trust.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Address of business firms will not be published in this department, but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

UTILIZING STRAIGHT SIDE TIRE ON CLINCHER RIM

I read in MOTOR AGE, July 13, the question in regard to using straight side tires on clincher rims. I have been using straight side tires on a Birch 32x3½ clincher demountable rim about 18 months. The method I use is as follows: Remove the rim from the wheel and saw the rim about the center of where one of the lugs comes. This permits the rim to close enough to install the straight side tire. I then take ⅝-in. cotton twisted rope and a screwdriver, or any other suitable instrument, and fill the side of rim or beads with this material. I drive the rope into place, starting always at the joint sawed into.—T. O. Linch, Flovilla, Ga.

Editor's Note—Although such a procedure as outlined by Mr. Linch is possible with the demountable type of clincher rim, we wish to state that this suggestion is applicable only to that type of rim. Where the clincher rim is of the true continental type, that is, the non-removable type of rim, wherein the rim is permanently affixed to the wheel felloe. such a procedure cannot be followed. However, we thank Mr. Linch for his contribution as it at least shows a spirit of co-operation.

Maintenance and Management of the Service Department

Q—We have one more problem which we must solve before we move into our new building, and that is, what is the best system to adopt in the service department, in regard to the maintenance and management? What kind of an offer must one make to a service manager in order to give him an attractive proposition and one he is going to work for?—E. W. Anderson, Anderson Motor Co., Norway, Mich.

In a general way, we should say that we believe you should pay your service manager a salary that is sufficiently above that paid to your best mechanic, to give him the dignity of position and, also, to give him confidence in himself. We cannot discuss the amount you should pay him because we do not know the range of salaries in your community.

In addition, we believe, this man should participate definitely in the earnings of the maintenance department. We think you should pay him a definite percentage of increased profits that are developed under his management. This will have to be worked out so that he is required to deliver, through his men, entirely satisfactory work. You should require that he arrange some system with the men whereby work not satisfactory to the customer is done over without cost.

Also, we believe there should be available for this man a stock of accessories which he can sell to customers. He should be given a definite percentage on all such sales which should be required to permit his mechanics to share in this percentage, when they couse the sales.

In the best maintenance shop today we believe the superintendent, or manager, is also the salesman. As a rule, if he establishes routine in the shop he does not have to give a great deal of attention to that work, except as a supervisor and inspector. He should be held responsible for inspecting the job, giving prices to the customers, seeing that the work is properly done and making a satisfactory delivery.

CLEARING CORRECTION

There appeared on page 42 of the August 3, 1922 issue of MOTOR AGE an equation intended to solve the number of teeth required in a drive pinion on a Stewart-Warner speedometer. An error occurred in the last sentence as follows:

"The number of teeth in drive gear times the axle ratio divided by the tires' size or tire diameter in inches times the swivel joint reduction."

The word "divided" should be substituted for "times."

Small General Repair Shop and Accessory Store

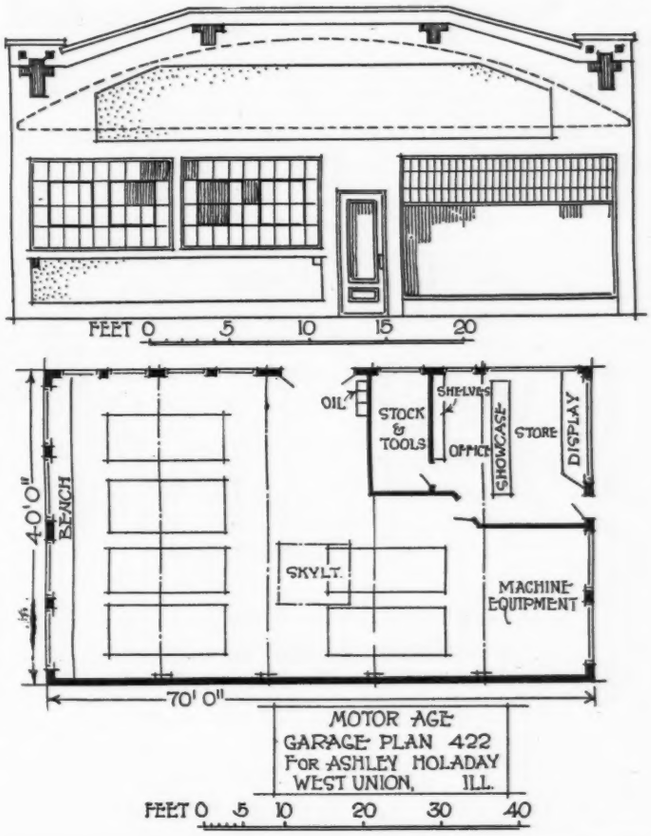
Q—I am going to build a garage building of concrete on a lot 40x70 ft., facing the east with side street on north. Would like you to give me information as to what thickness the walls should be and method of self-supporting the roof, proper situation of windows for best light and plans for good looking front. I desire the office and stockroom about 20 ft. square. Entrance to shop from front and at the back end of north wall.—Ashley Holaday, West Union, Ill,

You will waste a lot of space on a front entrance, which will do you very little good. In a building of this size it is not necessary to provide a drive-through; if a car drives in for quick service at the side entrance it is easy enough to back out. The traffic will never be so heavy that cars will be lined up to get through. Practically all the space that is occupied in the sketch by the two cars and machine equipment would be sacrificed or cut into to such an extent that it would be of little value.

There is no special form of truss for this job, most any form is suitable. We suggest one of the forms of lattice truss as being least expensive.

The front elevation shown in our sketch may be built of concrete blocks and finished with cement stucco or built in solid concrete. The solid concrete is hard to do, however, and get good results. Some bright colored tiles or brick set in as indicated will relieve the monotonous gray and if it can be arranged so that the forms can be taken down before the concrete gets too hard and the surface scrubbed a very beautiful effect is obtained.

Your walls, of a good mixture, would not need to be more than six inches thick, but to guard against weak places and make the forms easier to fill properly, they should be 8 or 10 inches in thickness. Where trusses rest it is customary to form piers, especially if thin walls are used.



Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

PROBABLE REMEDY FOR EXCESSIVE SPRING DEFLECTION

Q—We have a new model Saxon Sedan and want to know how to prevent the back tire from striking the inside of the body under the fender when rounding a corner or where a rough place is present in the road. It seems that the body is too wide to go between the wheels, as it is the inside part of the tire that strikes. The body seems to tilt too much when one wheel drops off in a hole, however, if both wheels dropped off in the same depth hole the wheels would not strike the body as it occurs only when the car is thrown into a tilting position.—J. W. Davis, Dallas, Texas.

Duplex chassis is suspended at the rear by what is known as double cross elliptic springs. An illustration of this principle of suspension is shown below. Assuming springs of equal deflection characteristics the amount of movement of the spring ends sideways can be controlled by variation of the lengths of the blocks shown between the two springs. By referring to the sketch it is apparent that lengthening the block will give a stiffer spring action and will reduce the side sway or end movement of the springs.

It is the usual practice where a heavy body such as an enclosed sedan body is mounted on the stock chassis to change the length of this spacer block or to install springs having heavier leaves or more leaves. In this case we are advised by the Saxon distributors that the sidesway can be eliminated by lengthening the double tapered block. We would suggest that you remove the present block and have one made that is approximately one inch longer on each end, that is, the total length two inches longer than the original block. Install this tapered block between the two springs and give the car a test.

If springs are too stiff the length of the block should be reduced about ¼ of an inch at a time until the proper degree of maximum deflection has been obtained. In the illustration shown it will be noted that the original spacer block has dotted lines at each end which represent the length which should be given to the replacement block. Care should be taken to see that the block follows the contour of both upper and lower springs. Check over carefully the tightness of the center spring bolt and see that all body bolts are tight. As before stated the block should be lengthened in easy stages and as a preliminary trial we would advise a 1½ to 2 inches longer than the original block.

FORD MAGNETO QUESTIONS

Q—Is there any reason why Ford magnets should demagnetize if they have been properly recharged with 24-volt storage batteries?

1—In general the current produced by any electrical machine has a tendency to demagnetize the field magnets. For this reason there is always a slight tendency for the magnets to become weaker but this method of charging if properly done should give very good results and improve the operation for ignition and lights.

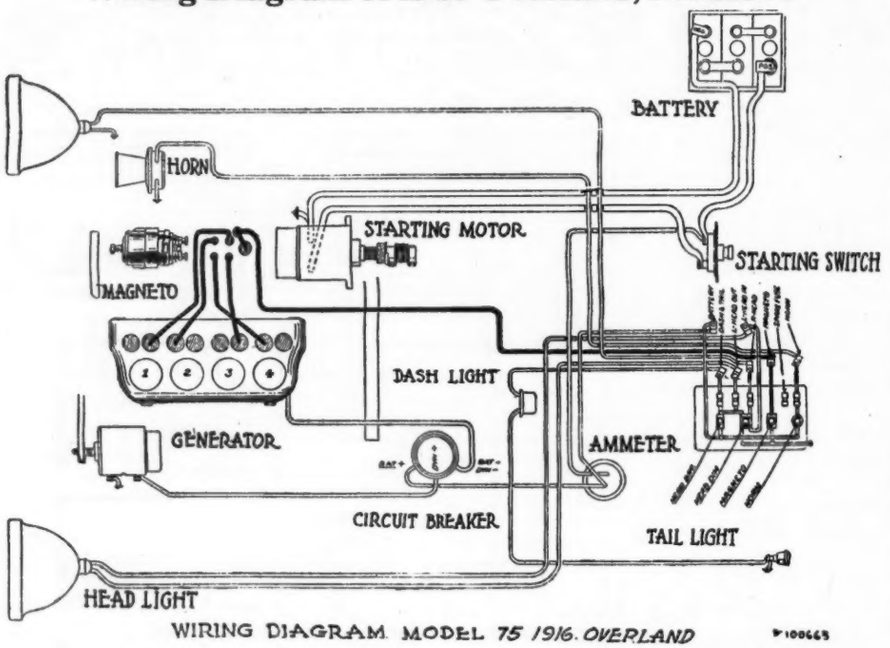
2—Will the lights be improved on a Ford with fully recharged magnets, this question referring to the older models?

2—Before the Ford magneto was used for lighting purposes the magnets were somewhat smaller than those used at present. It is possible that the cars referred to have these smaller magnets which will not hold a charge so well when heavy current, such as used for the lights, is taken from the magneto winding. Under these circumstances it might be well to check up the size of the magnets with those now supplied by authorized Ford dealers.

3—Where can one buy hollow steel drive shafting?—Ernest Neumann, care The Superior Repair Shop, Storm Lake, Iowa.

3—This information will be given by letter.

Wiring Diagram of 1916 Overland, Model 75



WIRING DIAGRAM MODEL 75 1916. OVERLAND

Q—Publish wiring diagram and firing order of an Overland 75.—H. F. Goheen, Wilmette, Ill.

1—The wiring diagram requested is shown above. The firing order is 1-3-4-2.

FORD SPEEDSTER FOR SMOOTH OPERATION

Q—We have in mind a design of a sporting roadster on a Ford chassis and wish your criticism on the following, bearing in mind that we are working for smoothness in operation rather than for extreme speed. The design will include a regular Ford block, reground and fitted with Kant-Skore pistons. A Ford light weight connecting rod will be used with a counterbalanced crankshaft. Pistons, rods and pins will be balanced singly and also when assembled within a fraction of an ounce.

Rajo head and Stromberg carbureter will be used. As car will be battery equipped some form of battery ignition will be used, probably a Remy system. All the magnets and screws will be removed from the flywheel and a plunger oil pump driven from No. 3 exhaust cam to deliver oil to the main bearings and to the timing gears in sufficient quantities to supply the rods also. Connecting rods will have nickel babbit bearings, drilled top and bottom for oil and grooved for oil circulation.

We now come to the part on which we will especially like to be advised. We wish to change the suspension of the front of the engine making it 4. instead of 3. point cutting off the end of the pan at the front motor support so as to install a light flywheel to compensate for the weight of the magnets and screws.

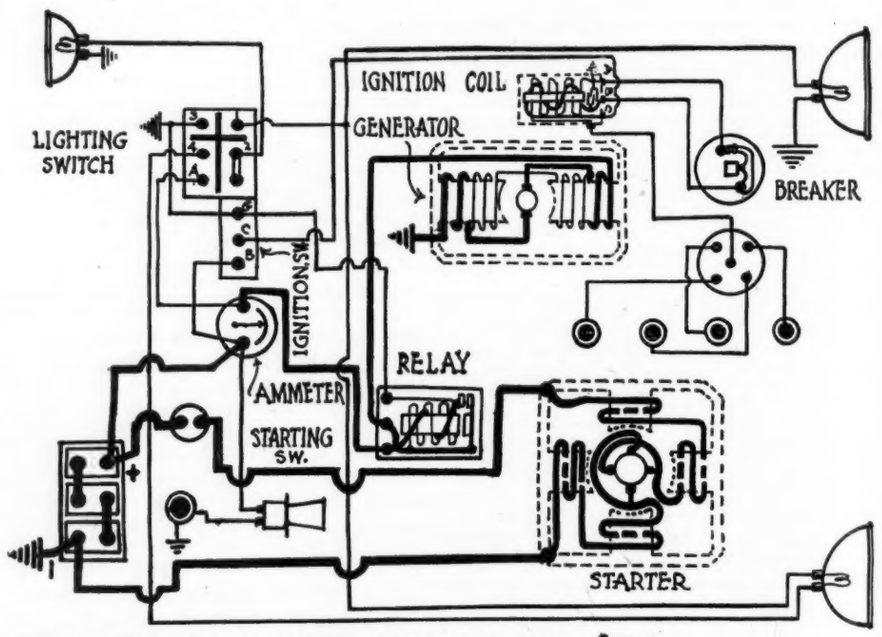
The flywheel may be screwed on as there will be no driving strain as the diameter and weight will be small. Standard Four gear ratio will be used or possible 4 to 1, as the object is to obtain a smooth running car to be easily handled in traffic. The crankshaft will be balanced both with and without flywheel on knife edge balance. Standard camshaft and ignition timing will be used. What is your opinion of this design?—G. C. Kelly, Dixie, Wash.

It is our opinion that the changes you contemplate will give a beautiful running car, but we absolutely do not approve of changing the motor suspension nor of adding a flywheel at the front. In fact, if it were necessary to add any weight to compensate for removing the magnets it would apparently be better to have a plain steel ring fastened with the same screws which ordinarily hold the magnets. Removal of the magnets, however, is usually done not merely to avoid the splash in the oil but to reduce the flywheel weight for the purpose of giving better pick-up.

We are personally familiar with the performance of a Ford car which is standard except for the use of battery ignition similar to the type you described and the elimination of the magneto coils and magnets. This car, however, has no special lubricating system and, in order to make the oil splash into the funnel shaped oil tube, double spools were put on each of the magnet holding studs. This gives fair lubrication but apparently skimps somewhat on the oiling.

This car handles well in traffic except that in slowing down to four or five miles an hour in high it is advisable to slip the clutch a little bit in picking up and also to retard spark to keep the engine from jerking. This is due to the reduction in weight on the flywheel. If you wish to make the car operate in high gear at very low speeds without the necessity of retarding the spark or perhaps occasion slipping the clutch would suggest that you leave the magnets on or if you feel that the almost inappreciable effect of the magnets splashing in the oil is undesirable you can replace them with a plain steel ring bolted to the flywheel.

We feel quite sure that you would get into serious trouble if you change the suspension of the Ford motor, as you will probably begin to break off the rear supporting arm which attaches the engine to the frame. Our personal preference would be to leave out the coils of the magneto but continue to use the magnets for the effect of their weight. With this car we believe you will find the standard gear ratio absolutely satisfactory, and will obtain not only smooth running at low speeds but also a degree of speed will be available when you need it which will surprise some of the other cars on the road.



WIRING DIAGRAN ON MONROE MODEL M-3 1917.

Q—Give wiring diagram of Monroe car Model M 3, four seated Club roadster. This has Auto-Lite starting and lighting system and Connecticut ignition.—Harry D. Parker, Greenfield, Mass.

1—Diagram requested is shown in the Fig. above.

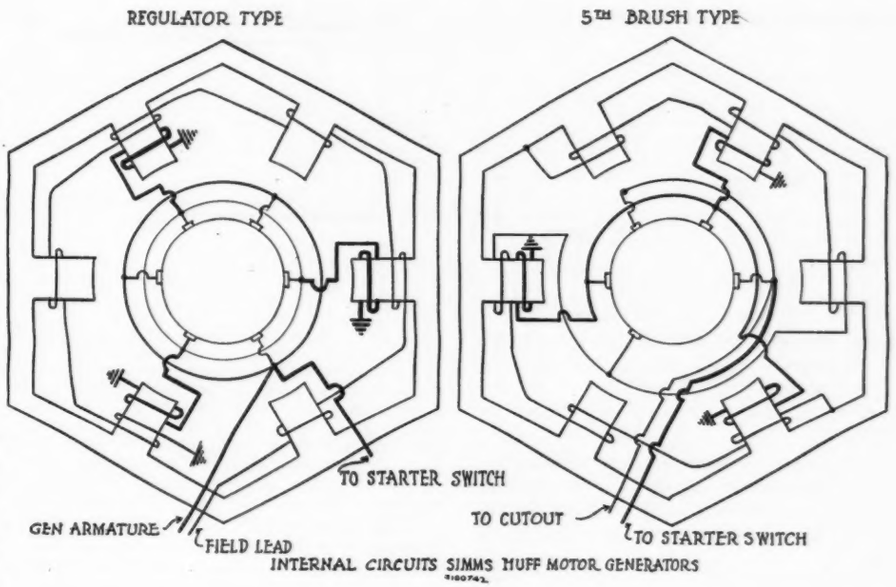
WIRING DIAGRAM OF TWO-WIRE SIMMS-HUFF SYSTEM ON MAXWELL

Q—Would like to have internal wiring diagram for two-wire Simms-Huff system as used on Maxwell cars. We wish to have internal circuits showing field coils and brush connections.—Battery & Radiator Shop, Martins Ferry, Ohio.

This request is rather indefinite as neither the year of the car or the number of the car is given, nor is it stated whether the machine in question is a generator or starting motor or a motor generator. The reference to the two wires does not say whether there are two wires on the battery or two wires coming from the machine or whether it is a two-wire electrical system.

As the Simms-Huff motor generators which were made with hexagonal frames were somewhat more complicated than the 1920 systems, we show at the right two diagrams which cover the various motor generators. The regulator type has six brushes, a shunt winding and a series winding. The shunt winding is distributed over all six field poles while the series winding is on three only. This type requires a vibrating regulator which is normally mounted on the cowl board.

This machine has been built for straight 12-volt operation, also for operation on 12 volts when starting and six volts when generating, but the internal circuits are the same in either case, the difference probably being in the size of wire used in the various coils for the different designs. The fifth brush type operates on the same general principle as the third brush machine and has both shunt and series windings which, as in the other machine, are located with the shunt distributed on the six poles and the series winding located on three poles only.



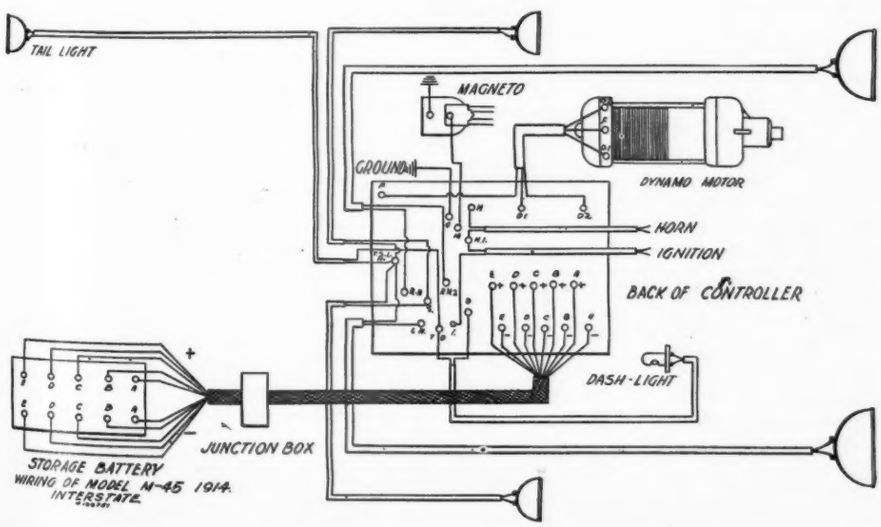
INTERNAL CIRCUITS SIMMS HUFF MOTOR GENERATORS

ELECTRICAL SYSTEM OF 1914 INTERSTATE

Q—Give all information available on the electrical system of model M-45 1914 Interstate. The car number was 6891. We would also like to know at what point to connect in an ammeter in this system, as we are having trouble in keeping the battery charged. There is no ammeter on the car, and while the test light shows that there is some charge, we do not know the exact amount.—Hugh C. Brown, Cambridge Battery Co., Cambridge, Mass.

1—The wiring of the model M-45 1914 Interstate is shown below. As the machine in question is a motor generator, it is practically out of the question to use an ordinary ammeter, as the current when operated as a starter would tend to burn it out. An ordinary ammeter could be used, however, for testing only by disconecting either the D 1 or D 2 wires from their terminals at the motor generator. Connected in one circuit, this ammeter will show the current going to battery while in the other circuit it will show the battery current plus the field current.

For example, in the D 1 line it might show 10 amperes and in the D 2 line 12 amperes. In this case 10 amperes would be the correct value to figure on as the actual charging current. The ammeter can be connected before starting up if the starting motor is not used and the engine is cranked by hand. Otherwise the ammeter should only be connected after the engine has started. For permanent installation a type of meter should be used which is especially designed to carry starting current without burning up. Name of a concern making this type of meter will be given by letter.



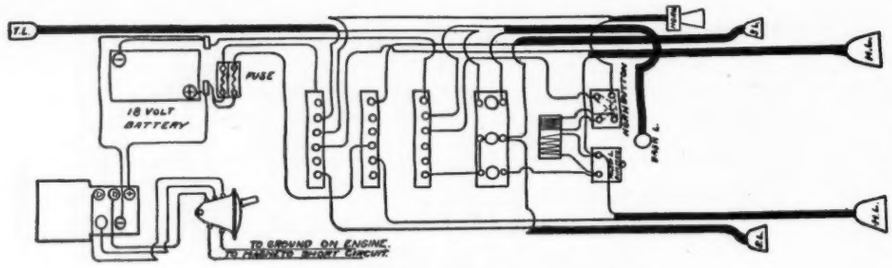
WIRING OF MODEL M-45 1914 INTERSTATE

A CASE WHERE EVERYTHING APPEARS O. K. BUT ISN'T

Q—We have a Packard 3-38 six, 1915, on which we are having considerable trouble. First, we reground the blocks, installed new pistons, pins, bushings and rings. Ground valve seats and refaced valves, checked timing and also have checked all cylinders, which test 1-60, 2-60, 3-58, 4-55, 5-60 and 6-65. Since having this car gone over it does not seem to have as much power as it should, and uses more gas than before. We have put a new carbureter air valve in same. Engine knocks when under load, which we thought was due to carbon, so burnt same. We have gone over this engine in every way that we can think of, but it does not come up to standard.—Butler Automotive Service, Lansing, Mich.

1—Although you state that the valve timing has been checked, we are of the belief that this is the most probable cause of the symptoms shown. It may be possible that at some time the flywheel has been removed and has not been installed in its original position on the crankshaft flange. The correct timing of the Packard 3-38 is as follows: Intake opens after upper dead center 9 degrees, exhaust closes after top dead center 4 degrees.

In addition to the probability of the engine being out of time, it is advisable to remove the muffler and note whether there is sufficient carbon deposit in the muffler to cause back pressure. These two we consider the most probable causes of the trouble, but we would suggest, in addition to the two things mentioned, that you check up on the timing and strength of spark of ignition system. If any of these suggestions fail to locate the trouble we should appreciate hearing from you again, and either MOTOR AGE or its readers may be able to suggest a cure for the trouble.



WIRING DIAGRAM SERIES-5-1914 FRANKLIN
#100470
Fig. 1

REO, FRANKLIN AND DODGE WIRING

Q—Publish wiring diagram of 1916 Reo speed wagon.

1—Diagram requested is shown in Fig. 3.

2—Publish diagram of 1914 Franklin.

2—The wiring of the series 4, 1914 Franklin is shown in Fig. 4, while the series 5, 1914 Franklin is shown in Fig. 1.

3—Publish wiring diagram of 1919 Dodge.

3—Dodge wiring covering models from 1917 up to the present is shown in Fig. 2.

4—There are several Dodge cars around here that seem to heat up excessively. Does the Dodge water pump system give any appreciable trouble or what is the most likely cause of overheating, and how can the pump be removed from the Dodge engine?

4—We do not know of any trouble being experienced with the Dodge water pump. The most likely cause of overheating is due to having the ignition improperly timed. With the spark lever in the retard position, the interrupter points just barely start to open as the piston is on firing dead center. If such is not the case it can be corrected by means of the adjustable cam under the distributer cap. Answering your question however as to the method of removing the Dodge water pump would say that it is first necessary to take the radiator off. You will then find two bolts which attach the water pump to the cylinder block also two which attach it to the crankcase. These should be removed. There are also six bolts placed in a circle around the pump housing and these should also be taken out, after which the water pump can be taken off.

5—Where can we purchase a book of wiring diagrams on all makes of cars?—E. D. Bukove, care Valley Garage, Therma, N. M.

5—This information will be given by letter. We wish to commend you on your desire to have information of this character as we do not know of anything much more essential in an electrical service station where all sorts of different makes of cars are handled.

LOOSE CONNECTION PROBABLE CAUSE OF THIS TROUBLE

Q—We have a Ford engine that has been recently overhauled, all bearings having been rebabbitted, also new rings have been put on the pistons and the valves have been ground. The piston clearance is about .005 and the ring clearance about one one-hundredth. This engine will suddenly start missing at most any speed and sometimes by retarding the spark and sometimes by advancing the spark it will pick up and hit regularly. It has run as far as 150 miles without missing a shot and then suddenly started giving trouble. Have tried new looms and new timers and rollers, all to no avail. Sometimes it starts fine and at others it will hardly start. We have drained the gas line, carbureter, and sediment bulb several times. Can you tell what is the trouble?—A Reader.

From your description of the trouble it appears to be due to a loose connection in the wiring or poor contact at some point in the ignition circuit. Advancing and retarding the spark should have no effect unless the rotation of the timer moves the wires thus making a contact which was otherwise broken. This could hardly be anywhere except at the soldered connection of the timer wires to the terminal. It is also possible that the correction of the trouble is a coincidence and we would suggest your checking the whole ignition circuit.

It might be well to start at the magneto and take out the magneto contact terminal which is held with three screws and see if the spiral spring which extends down into the magneto housing is making good clean contact with the tip of the coil. It might also be well to take the coils out of the coil box and take the coil box off the car and carefully inspect the wiring inside of it as it is possible that one of the soldered connections has broken loose and sometimes makes contact and sometimes fails to do so.

Another way to check the ignition action is to wait until the car misbehaves and then get all of the spark plug wires loose on the plugs so that with the engine running they can be removed one at a time and held within 3/16 inch of the engine. Sparks should jump regularly at this improvised gap which would indicate that the ignition is in good condition. If the sparks miss occasionally, however, there is no use checking the carbureter until this ignition trouble has been overcome. On the other hand, if the sparks hit regularly at all plugs and the plugs are clean and the engine is still missing, then it is time to check up the carbureter.

Another way to make a possible check on the condition is to install a battery so that when the engine starts to miss the ignition can be turned over to the battery side as this would detect trouble which might be in the magneto although the battery ignition is not much good at very high speeds and is also rather poor at medium speeds. For successful operation the engine needs good compression, good plugs, ignition spark properly timed and correct mixture and with all of these it can hardly fail to operate properly.

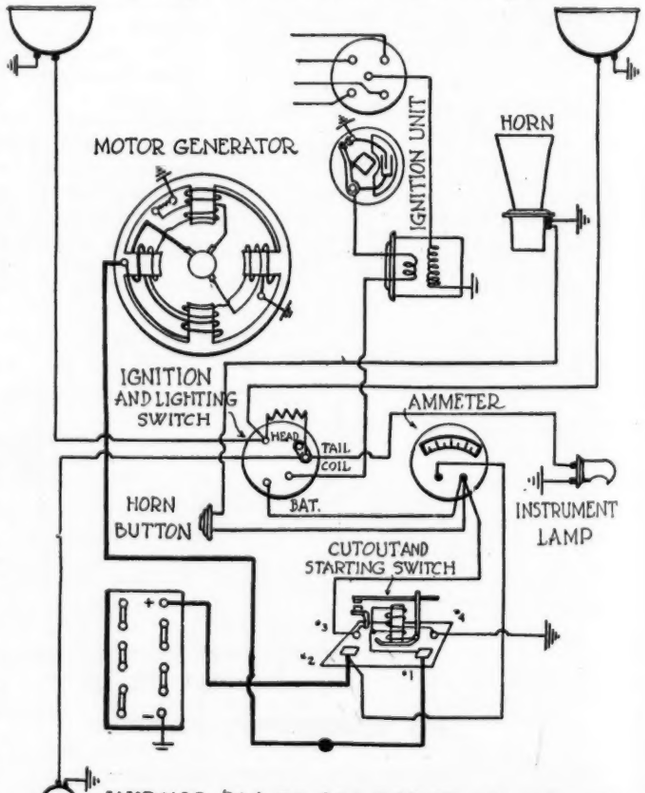
GREATER POWER FOR SAXON

Q—How much can be safely removed from the valve ports of a Saxon 4, model 1918, engine in order to secure greater power?

1—MOTOR AGE does not know the exact amount of material that can be removed from the valve ports on this engine. Judging, however, from the construction of the average cylinder casting, it should be possible to remove at least 5/32 of an inch. This will mean that the diameter could be increased about 5/32 of an inch which would mean the removal of 5/64 of an inch of material from each side.

2—What size valves can be installed? Give any other means of increasing power.—Hortman's Repair Shop, Washington, Pa.

2—We believe that the maximum size



WIRING DIAGRAM DODGE 1917 TO 22.
#100471
Fig. 2

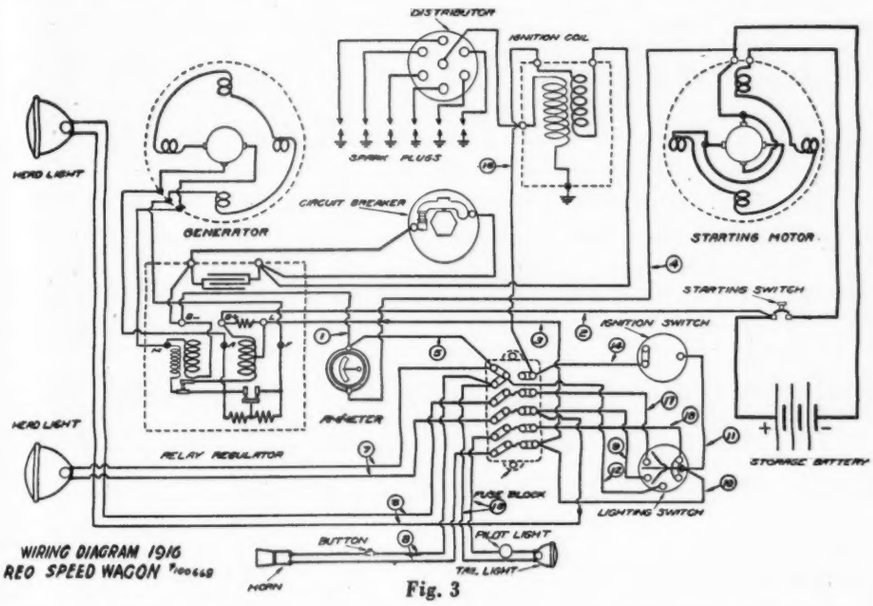


Fig. 3

valves to be installed is best determined when one has the block at hand where measurements can be made. As on the valve ports the amount of material that can be removed in order to enlarge the valves is about the same as stated. The installation of a one-inch carbureter, a new ignition system and different timing which can be determined only by experiment, are the principle items to be given attention. Of course the very lightest pistons obtainable should be installed and the connecting rods should be lightened as far as possible without weakening and the engine balanced carefully before assembly. A very fast Saxon speedster was built by E. W. Zwiebel, Burlington, Wis., and we would suggest that you communicate with this man.

REMOVING STAINS FROM ALUMINUM AND BRASS

Q—What is the best method of cleaning stains on aluminum crankcases and brass carbureters?

1—For cleaning aluminum a solution of 30 grammes of borax in 1 litre (approximately a quart) of water containing a few drops of aqua ammonia. Another recommended solution consists of one heaping teaspoonful of oxalic acid crystals to one gallon of luke warm water. The object should be allowed to stand in this solution over night and should be then thoroughly rinsed with clear hot water.

For cleaning brass the method used by United States Arsenals is recommended. This plan includes using a mixture consisting of one part of common nitric acid and one-half part of sulphuric acid in a stone jar, having also ready a pail of fresh water and a box of sawdust. The article to be cleaned is dipped into the acid then removed into the water and finally rubbed with sawdust which gives a brilliant finish. If the brass has become greasy it is first dipped in a strong solution of potash and soda in warm water. This removes the grease so that the acid treatment above described will be effectual. These methods of cleaning aluminum and brass are taken from the Scientific American Cyclopedia of Formulas.

2—How can an 18-24-volt system be changed to a six-volt system? Would it be more economical to rewind the present generator and starter or purchase a new one? If it should be rewound, where would be the most practical place to send it?—C. A. Maino Motor Car Co., San Luis Obispo, Calif.

2—Under ordinary circumstances it is not advisable to try to change the voltage of one of the older type starting and lighting systems by the method you contemplate. It is sometimes possible to eliminate the starting feature and use the device as a six-volt generator only which does not involve much complication. More information could be given if the exact car on which this is used had been stated, as the change in voltage usually involves not only the generator or starting motor but also the battery, lamps and probably a regulator of some sort which may be mounted on the dash or cowl board.

With additional information, however, more definite advice could be given. If nothing were involved except the generator or starting motor itself the general rule could be used which is well known to designers of electrical machinery. This rule means that in changing from a 24-volt winding to a 12-volt winding that, in the field coils and armature, wire would be used which has just exactly twice the cross sectional area. In other words, if number 21 wire had been used in the field then a change could be made to number 18 wire which is twice as big and as the size increases there will of course be room for half the number of turns. To change down to 6 volts would require another reduction in the number of the wire which gives a corresponding increase in size. As previously stated, however, a change of this kind would not be desirable without thoroughly considering all other features of the whole electrical system on the car.

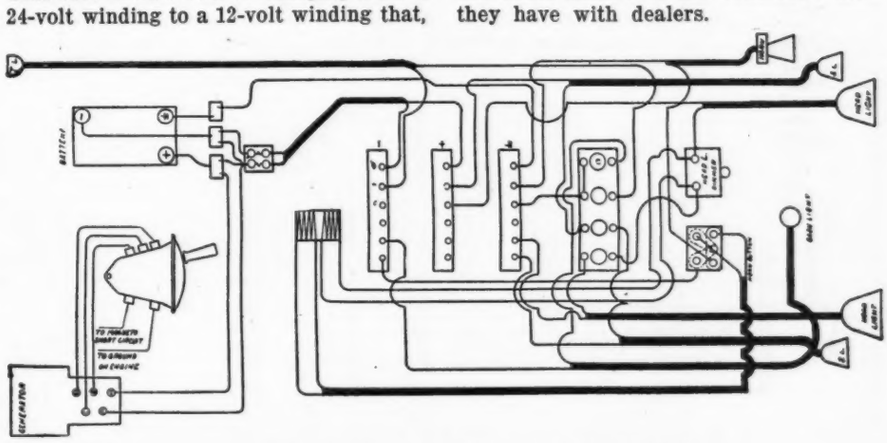
WIRING OF 1916 DODGE

Q—Give wiring diagram of the 1916 Dodge car. Also advise whether it is possible to operate this car without a battery.

1—A wiring diagram of the 1915 Dodge which is the same as for 1916 was published in the May 25, 1922, issue of MOTOR AGE. It is not feasible to use a Dodge car without having a battery. There are two reasons for this, first, the generator will be in danger of overheating unless the vibrating regulator is perfectly adjusted and even so the regulator is called upon to do excessive work. If it were not for the vibrating regulator the generator would quickly burn up. On Dodge cars battery ignition is used so that if the battery is not used it will be necessary to connect up a string of dry cells to give approximately the same voltage as the storage battery. Without a battery it would also be undesirable to operate the headlights as they might burn out unless the voltage regulator were operating perfectly, while with a third brush type of machine used on later Dodge cars, there is no question but what the lamps would burn out instantly if turned on when running without a battery.

2—Can you advise whether the agency for the Star and Durant cars includes selling franchise on both products or whether they are given out separately?—E. H. Plummer, Webster, Wis.

2—If you are interested in agency for either or both of these cars, would suggest your writing to the Durant Motors Company, 560 Jackson Ave., Long Island City, N. Y., as we are not informed as to the exact nature of the contract which they have with dealers.

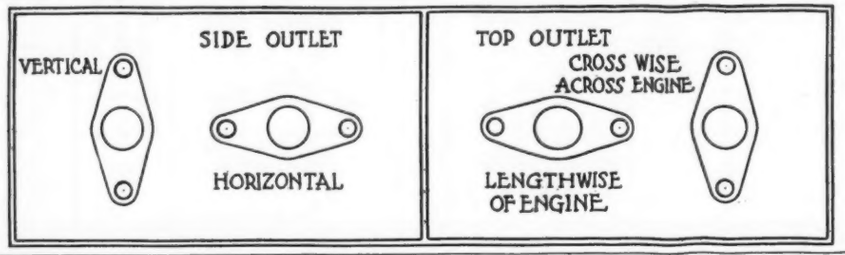


WIRING DIAGRAM SERIES-4-1914 FRANKLIN

Fig. 4

Carbureter Equipment on 1922 Passenger Cars

Motor Age Maintenance Sheet No. 181



MAKE AND MODEL	CARBURETOR						Hot Air Flexible Tube	
	Make	Model	Size	Type of Connection	Type of Flange	Air Preheated	Outside Diam.	Length
Ace, F	Stromberg	LB1	1	Side Outlet	Horizontal	yes	2¼	12
Ace, L	Stromberg	LB2	1¼	Side Outlet	Horizontal	yes	1½	26
Ace, C	Ball & Ball	SV12	1½	Top Outlet	Crosswise	yes	.....	.....
Ambassador, R	Stromberg	OU3	1½	Top Outlet	Crosswise	yes	2	20
American, C	Stromberg	LB2	1¼	Side Outlet	Vertical	no	.....	.....
Anderson, 40	Rayfield	GL3	1¼	Top Outlet	Lengthwise	no	.....	.....
Apperson, 8	Johnson	A	1¼	Top Outlet	Lengthwise	no	.....	.....
Auburn, 6-51	Rayfield	L3P	1¼	Top Outlet	.....	no	.....	.....
Bay State	Stromberg	O-Z	1¼	Top Outlet	.....	no	.....	.....
Bell, 6-50	Stromberg	S2	1¼	Side Outlet	.....	no	.....	.....
Biddle, B-1	Zenith	HP5A	1¼	Side Outlet	Crosswise	no	.....	.....
Brewster, 02	Zenith	L6B	1½	Top Outlet	Lengthwise	yes	2⅛	26
Buick, Six	Marvel	Special	1¼	Top Outlet	Lengthwise	no	.....	.....
Buick, Four	Marvel	Special	1¼	Top Outlet	Lengthwise	yes	.....	.....
Cadillac, 61	Own	.....	2	Top Outlet	Lengthwise	no	.....	.....
Case, X	Rayfield	2-3-P	1¼	Top Outlet	Lengthwise	yes	.....	.....
Case, W	Rayfield	G4	1½	Top Outlet	.....	yes	.....	.....
Chalmers	Stromberg	L2	1¼	Top Outlet	.....	yes	.....	.....
Chandler	Rayfield	G-3-P	1¼	Top Outlet	Lengthwise	yes	1½	15
Chevrolet, 490	Zenith	T4	1	Top Outlet	Lengthwise	yes	1½	20½
Chevrolet, FB	Zenith	O-4	1	Top Outlet	Crosswise	yes	.....	.....
Cleveland, 40	Stromberg	MB1	1	Side Outlet	Vertical	yes	.....	.....
Cole, 870	Johnson	12M	1½	Top Outlet	Crosswise	yes	.....	.....
Columbia, L6	Stromberg	O-1	1	.....	.....	yes	.....	.....
Comet, C-53	Stromberg	LB2	1¼	Side Outlet	Vertical	yes	1⅝	15
Crawford, 6-60	Stromberg	LB2	1¼	Side Outlet	.....	.....	.....	.....
Cunningham, V-4	Stromberg	O-3	1½	Top Outlet	Lengthwise	yes	.....	.....
Daniels, 8-19	Zenith	O-D-5	1¼	Top Outlet	Crosswise	.....	.....	.....
Davis, 71	Stromberg	.....	1	Top Outlet	.....	.....	.....	.....
Davis, 61	Stromberg	L-S-2	1¼	Top Outlet	.....	.....	.....	.....
Dixie Flyer	Stromberg	M-V-1	1	Side Outlet	Vertical	yes	1⅞	13½
Dodge Brothers	Stewart	25	1	Top Outlet	Crosswise	.....	.....	.....
Derris, 6-80	Stromberg	L-3	1½	Top Outlet	Crosswise	.....	.....	.....
Dort, 19	Carter	N	1	Side Outlet	Horizontal	no	.....	.....
Driggs	Zenith	HP4B	1	Side Outlet	.....	yes	.....	.....
Duesenberg	.....	.....	1½	Side Outlet	Vertical	no	.....	.....
DuPont, A	Yale & Town	Swan	1½	Top Outlet	.....	yes	.....	.....
Durant, A-22	Tillotson	L-1A	1	Side Outlet	Horizontal	yes	1½	3
Durant, B-22	Rayfield	MRV-4	1½	Side Outlet	Horizontal	yes	1⅝	4⅜
Earl, 40	Scoe	.....	1	Side Outlet	Horizontal	yes	.....	.....
Elcar, 4	Stromberg	.....	1	Top Outlet	Crosswise	yes	2¼	4½
Elcar, 6	Stromberg	.....	1¼	Top Outlet	Crosswise	yes	2¼	14¾
Elgin, 6 K-1	Stromberg	O-S-1	1	Side Outlet	Vertical	yes	1¹¹⁄₁₆	9¾
Essex	Own	.....	1¼	Side Outlet	Horizontal	yes	.....	.....
Ford, T	Own	.....	1	Side Outlet	Horizontal	yes	*1¼	6¾
Franklin, 9-B	Own	.....	⅞	Top Outlet	Lengthwise	yes	*1¾	.....
Gardner	Carter	N-0	1	Side Outlet	Horizontal	yes	.....	.....
Grant	Stromberg	L-1	1	Top Outlet	Lengthwise	yes	.....	.....

MAKE AND MODEL	CARBURETOR						Hot Air Flexible Tube	
	Make	Model	Size	Type of Connection	Type of Flange	Air Preheated	Outside Diam.	Length
Jackson, 638	Stromberg	LS-2	1¼	Top Outlet	Lengthwise	no	.....	.....
Jewett, Six	Stromberg	O-82	1¼	Side Outlet	Vertical	yes	*2½	19⅝
Jordan, MX	Stromberg	LS-2	1¼	Top Outlet	Crosswise	yes	1¹⁵⁄₁₆	13½
King, 8	Ball & Ball	.....	1¼	Top Outlet	Crosswise	no	.....	.....
Kissel	Stromberg	LB-2	1¼	Side Outlet	Vertical	yes	*1⅝	.....
Kline, 6-55-K	Rayfield	L-3-P	1¼	Top Outlet	Lengthwise	yes	.....	.....
LaFayette	Johnson	.....	2	Top Outlet	Lengthwise	yes	.....	.....
Leach	Rayfield	3-M-V	1¼	Side Outlet	.....	no	.....	.....
Lexington, T-22	Rayfield	.....	1½	Side Outlet	Vertical	yes	1½	4½
Lexington, ST-22	Rayfield	.....	1½	Side Outlet	Vertical	yes	1½	4½
Liberty, 10-D	Stromberg	.....	1	Side Outlet	Horizontal	yes	1⅝	6⅝
Lincoln	Stromberg	.....	1½	Top Outlet	.....	.....	.....	.....
Locomobile, 48	Ball & Ball	Special	1¹³⁄₁₆	Top Outlet	.....	yes	.....	.....
Maibohm, B	Tillotson	.....	1	Side Outlet	Vertical	yes	1¾	9⅝
Marmon, 34	Stromberg	H-3	1½	Top Outlet	Lengthwise	no	.....	.....
Maxwell	Eagle	.....	1	Side Outlet	.....	.....	.....	.....
Mercer, 5	Ball & Ball	.....	1½	Top Outlet	Horizontal	yes	.....	.....
Merit	Stromberg	LS-2	1¼	Top Outlet	Crosswise	yes	2⅜	12
Mitchell, F-50	Stromberg	O-2	1¼	Top Outlet	Lengthwise	no	.....	.....
McFarlan, TV	Rayfield	.....	1¾	Top Outlet	Lengthwise	yes	.....	.....
Monroe	Zenith	HP5A	1¼	Side Outlet	Vertical	yes	1⅝	23
Moon, 6-40	Stromberg	O-2	1	Top Outlet	Lengthwise	yes	1¾	12
Moon, 6-48	Stromberg	O-2	1¼	Top Outlet	Lengthwise	yes	.....	.....
Nash, 4	Schebler	AX-84	1	Top Outlet	Lengthwise	yes	.....	.....
Nash, 6	Marvel	.....	1¼	Top Outlet	Lengthwise	.....	.....	.....
National, BB	Rayfield	G4P	1½	Top Outlet	Lengthwise	no	.....	.....
Noma, 1D	Zenith	.....	1	Top Outlet	.....	yes	.....	.....
Noma, 3C	Caubel	.....	1¼	Top Outlet	.....	yes	.....	.....
Norwalk, 4-30	Zenith	O-4	1	Side Outlet	Horizontal	yes	1¼	7
Oakland, 6-44	Marvel	E	1	Top Outlet	Lengthwise	yes	.....	.....
Ogren, Six	Rayfield	.....	1¼	Top Outlet	Lengthwise	yes	1	17
Oldsmobile, 43A	Zenith	T-4	1¼	Top Outlet	Lengthwise	yes	1¼	20
Oldsmobile, 47	Johnson	B	1½	Top Outlet	Lengthwise	no	.....	.....
Oldsmobile, 46	Ball & Ball	Double	1¼	Top Outlet	Lengthwise	no	.....	.....
Packard, Twin 6	Own	335	1⅝	Top Outlet	Crosswise	no	*1⅝	12¼
Packard, S6	Own	116	1⅛	Side Outlet	Horizontal	no	.....	.....
Paige, 6-66	Rayfield	G-4-P	1¼	Top Outlet	Lengthwise	yes	1¹⁄₁₆	14¼
Paige, 6-44	Stromberg	L-B-1	1	Side Outlet	Vertical	yes	.....	.....
Paterson, 6-52	Stromberg	S-S-2	1¼	Top Outlet	Crosswise	yes	.....	.....
Peerless, 56	Ball & Ball	D-V-12	1⅛	Top Outlet	Crosswise	no	.....	.....
Pierce Arrow, 33	Own	.....	1⅛	Top Outlet	Lengthwise	yes	.....	.....
Pilot, 6-50	Tillotson	.....	1¼	Side Outlet	Horizontal	yes	1¾	19½
Premier, 6-D	Johnson	B	1¼	Top Outlet	Crosswise	no	.....	.....
Premocar	Stromberg	M-B-1	1¼	Side Outlet	.....	no	.....	.....
R. & V. Knight, R	Stromberg	OC	1¼	Side Outlet	Vertical	yes	1³¹⁄₃₂	26
R. & V. Knight, J	Stromberg	OC	1¼	Side Outlet	Vertical	yes	1³¹⁄₃₂	26
Reo, T6	Rayfield	.....	.....	Top Outlet	Lengthwise	no	.....	.....
Revere, C	Stromberg	M-4	1¾	Top Outlet	Lengthwise	yes	2½	3
Rickenbacker, A	Stromberg	O	1¼	Top Outlet	Lengthwise	yes	2	8
Roamer, 6-54	Stromberg	LB-2	1¼	Side Outlet	Vertical	yes	1⅝	18
Roamer, 4-75	Stromberg	O-3	1½	Top Outlet	Lengthwise	yes	2½	10
Rolls Royce	Own	.....	.....	Top Outlet	.....	yes	.....	.....
Saxon, Duplex 125	Stromberg	M-2	1¼	Top Outlet	Lengthwise	no	.....	.....
Sayers Six, DP	Stromberg	LS-2	1¼	Top Outlet	Lengthwise	yes	2¼	13
Seneca, L&O	Zenith	T-4	1	Top Outlet	Lengthwise	yes	1⅜	6
Sperling, A	Zenith	HP	1¼	Side Outlet	Vertical	yes	.....	.....
Standard	Zenith	.....	1¼	Top Outlet	Crosswise	yes	.....	.....
Stanwood, A-22	Stromberg	L-S-2	1¼	Top Outlet	Crosswise	yes	2	16
Stearns Knight, SKL4	Rayfield	.....	1¼	Top Outlet	Crosswise	yes	1⅜	9¾
Stephens, 90	Tillotson	H-1-A	1¼	Side Outlet	Horizontal	yes	*1¹¹⁄₁₆	29½
Stevens-Duryea, E	Stromberg	O	1½	Top Outlet	.....	yes	.....	.....
Studebaker, L6	Stromberg	O-S	1	Side Outlet	Horizontal	.....	.....	.....
Studebaker, S6	Stromberg	.....	.....	Top Outlet	Lengthwise	yes	2½	7½
Studebaker, B6	Ball & Ball	.....	.....	Top Outlet	Lengthwise	yes	1¹¹⁄₁₆	9
Stutz, K	Stromberg	O-2	1½	Top Outlet	Crosswise	yes	2⅛	14¾
Templar, 445	Stromberg	M-2	1¼	Top Outlet	Crosswise	no	.....	.....

Halladay, 4	Stromberg	.....	1	Top Outlet	Lengthwise	yes	1½	8
Halladay, 6	Stromberg	.....	1⅜	Side Outlet	Vertical	yes	1½	13½
Hanson, 6	Marvel	Special	1¼	Top Outlet	Lengthwise	yes	¾	10
Hatfield, A-42	Zenith	HP	1¼	Side Outlet	Horizontal	yes	1 5/32	24½
Handley-Knight, B	Tillotson	.....	1¼	Side Outlet	Vertical	yes	.....	.....
Haynes, 55	Rayfield	M-3	1¼	Side Outlet	Vertical	yes	.....	.....
Haynes, 75	Stromberg	OU-3	1½	Top Outlet	Lengthwise	yes	.....	.....
H. C. S.	Stromberg	.....	1¼	Top Outlet	.....	.....	.....	.....
Holmes, 4	Stromberg	O-1	1	Top Outlet	Lengthwise	yes	.....	.....
Hudson, Super 6	Own	.....	1½	Side Outlet	Vertical	yes	.....	.....
Hupmobile, R	Stromberg	O	1	Top Outlet	Lengthwise	yes	.....	.....

Tulsa	Zenith	HP-1B	1¼	Side Outlet	.....	no	.....	.....
Velie, 58	Stromberg	O S L	1	Side Outlet	Vertical	yes	.....	.....
Velie, 34	Stromberg	.....	1	Side Outlet	.....	no	.....	.....
Washington, 6	.....	.....	1¼	Side Outlet	Vertical	yes	1½	10½
Westcott, C-48	Rayfield	M	1¼	Side Outlet	Vertical	yes	1½	13¾
Westcott, A-44	.....	.....	1¼	Top Outlet	Crosswise	yes	.....	.....
Wills Sainte Claire	Zenith	Duplex	1⅜	Top Outlet	.....	yes	.....	.....
Willys-Knight	Tillotson	.....	1¼	Side Outlet	Horizontal	no	.....	.....
Winton, 40	Rayfield	.....	1¾	Top Outlet	.....	yes	.....	.....

*—Denotes non-flexible tube

Hose and Tubing Sizes for 1921 Passenger Cars

Motor Age Maintenance Data Sheet No. 182

NAME AND MODEL	RADIATOR HOSE						TUBING (Outside Diameter)	
	UPPER			LOWER				
	Number of Pieces	Length	Diameter (Inside)	Number of Pieces	Length	Diameter (Inside)	Gasoline Line	Oil Line
Allen, 43	1	6	2½	2	2½	2	¼	⅜
Ambassador	1	6	1½	1	9	1¼	5/16	.....
American	.....	.....	.....	.....	.....	.....	.....	.....
Anderson, 40	1	10	1¼	1	9½	1¼	.....	.....
Apperson	1	12	3	.....	.....	2	5/16	.....
Auburn, 6-39	.....	2	1¼	.....	12½	1¼	5/16	¼
Biddle	1	4½	2⅛	1	5	1⅝	.....	.....
Bour Davis	.....	9¾	1½	.....	8½	1¼	5/16	¼
Brewster	1	27⅛	1 7/32	1	9	1 7/32	5/16	.....
Briscoe, el—special elbow	1	5	2	1	5	2	.....	.....
Buick, Four	2	4½	1⅝	1	8	1⅜	.....	.....
Buick, Six	1	8	1¼, 1⅜	2	15¾, 2⅝	1¼	.....	.....
Cadillac	Special	.....	.....	Special	.....	.....	.....	.....
Case, V	1	9	1½	1	6¾	1¼	5/16	5/16, ¼
Champion	1	10	2¼	1	14	2¼	¼	¼
Chandler	1	10½	1⅝	1	8 7/16	1⅝	5/16	½, ¼
Chevrolet, 490	1	4⅝	1¼	1	3⅝	1¼	.....	.....
Cleveland, 40	1	3½	¼	1	6½	1¼	5/16	¼, ⅜
Cole, 870	2	22½	1½	1	3¾	1¼	.....	.....
Columbia, Challenger	2	2¼, 3½	1¼, 1¼	1	13	1¼	.....	.....
Climber, S	1	15½	½	1	8	1½	5/16	5/16
Crawford	1	10½	1¼	1	10½	1¼	.....	.....
Cunningham, V-4	2	5½	1¼	2	3⅜	1¼	5/16	5/16
Daniels, D19	1	6	1¾	1	8⅝	1¾	.....	.....
Dixie Flyer	1	14	2	1	17	2	5/16	5/16
Dodge Bros.	1	7	1½	1	7¼	1 5/16	¼	¼, 5/16
Dorris	1	2¼	1½	2	6¼	1¼	.....	.....
Dort	1	6	2¼	1	14¼	2¼	5/16	¼
Elcar, K-4	1	11	2⅜	1	19	2⅜	¼	5/16
Elcar, 7-R	1	4	1¼	1	12	1¼	5/16	¼
Elgin, K	1	7½	1⅞	1	1 5/16	1⅞	5/16	¼
Essex	1	4	2¼	1	14½	2½	.....	.....
Ford, T	1	4	2	2	2¾	1¾	.....	.....
Franklin	none	.....	.....	none	.....	.....	⅜	¼
Friend, Four	1	6	2	1	8¾	2	.....	.....
Gardner	1	9½	2¼	1	15	2¼	.....	.....
Grant	1	8	2¼	2	3¾	2¼	.....	.....
Hanson, 60	1	9½	1	1	12½	1	5/16	¼
Handley-Knight	1	5½	2¾	1	5½	2¾	.....	.....
Haynes, 47	.....	14½	1¼	.....	9½	1½	.....	.....
Hatfield	.....	11	2	.....	15	2	.....	.....
H. C. S.	1	6 11/16	1¾	1	3¼	1¼	.....	.....
Hudson	1	3⅝	1½	1	9¼	1½	⅜, ¼	⅜
Hupmobile, R	1	10⅜	2¼	1	9 1/16	2	5/16, 5/16	½, 5/16
Holmes	none	.....	.....	none	.....	.....	5/16	¼, ⅜
Jordan, M	1	9½	1¼	1	12½	1¼	5/16	⅜, ¼
King, 8	2	7½	2¼	2	3½	1¾	.....	.....
Kissel	1	8⅝	1¼	1	10 11/16	1¾	.....	.....
Kline, 6-55	1	7½	1¼	1	16	1¼	5/16	¼
LaFayette, 134	4	6	1⅛	2	4¼, 2½	1¼, 1¼	¼	5/16
Leach	1	6½	1½	1	6½	1¼	.....	.....
Lexington, T	.....	7	1¼	.....	6	1¼	5/16	¼
Liberty, 10-C	1	6	2¼	1	13½	2¼	5/16, 5/16	5/16

NAME AND MODEL	RADIATOR HOSE						TUBING (Outside Diameter)	
	UPPER			LOWER				
	Number of Pieces	Length	Diameter (Inside)	Number of Pieces	Length	Diameter (Inside)	Gasoline Line	Oil Line
Locomobile, 48	1	2¾	1⅜	1	5	1⅜	.....	.....
Lorraine, 21T	.....	9½	2	.....	16½	2	5/16	5/16
Maibohm, B	1	13	1⅞	1	6	1⅞	.....	.....
Marmon, 34	1	3⅞	1¼	1	3⅞	1¼	.....	.....
Maxwell	.....	.....	.....	.....	.....	.....	.....	.....
Mercer	1	8¾	1 11/16	1	14½ (el)	1⅜	5/16	5/16
McFarlan, T V	1	3½	2	1	9¾	1¼	5/16	5/16, ⅜
Merit	1	7	1¼	1	7	1¼	.....	.....
Metz	.....	14	1½	.....	12	1	¼	¼
Meteor	.....	4	1½	.....	4	1½	5/16	5/16
Mitchell, F-40	1	5⅜	1½	1	7¾	1⅛	5/16	5/16
Monroe	1	5	2	1	15½	1¾	5/16	5/16
Moon, 6-48	1	10	1¼	1	12	1¼	5/16	¼
Nash, Six	1	6	1½	1	4	1¼	5/16	¼
National, BB	1	(el)	1½	1	13	1½	5/16	¼
Oakland, 34C	1	16¼	1¼	2	3 7/16	1	.....	.....
Oldsmobile, 43A	1	6¼	1¾	1	10½	1¼	.....	.....
Overland	.....	6	2	.....	10	1¾	5/16	¼
Packard, Single 6	1	.....	1½	1	6¾	1¼	5/16	¼
Packard, 335	1	8 1/16	1½	1	8	1⅝	⅜	¼
Paige, 6-42	1	9½	1½	1	10½	1⅛	.....	.....
Paige, 6-66	2	1 1/16	5½	.....	.....	.....	.....	.....
Pan-American, 6-55	1	14	1⅞	1	7	1½	5/16	¼
Paterson, 6-50	1	10½	1¼	1	13	1¼	.....	.....
Peerless, 56	2	7	1 15/32	1	5½	2 1/32	.....	.....
Pierce Arrow	1	.....	2⅜	1	.....	1½	.....	.....
Pilot, 6-45	1	10	1½	1	6½	1	¼	5/16
Premier	1	5¾	¼	1	8½	¼	5/16	5/16
R & V Knight, J	1	10 15/16	2½	1	17½	2¼	5/16	⅜
Reo, T6	1	12	1½	1	8¾	1¼	¼	¼
Revere	1	9	1½	1	7	1½	5/16	¼
Roamer, 4-75	1	7	1½	1	13	1½	5/16	5/16
Roamer, 6-54	1	13	1½	1	13	1¼	5/16	5/16
Rolls Royce	1	.....	1½	1	.....	1½	5/16	.....
Saxon, 125G	1	4⅜	2 5/16	1	10½	2 5/16	.....	.....
Sayers Six, DP	1	12	1¼	1	12	1¼	¼	¼
Scripps-Booth	.....	18½	1¼	.....	8½	1	.....	.....
Skelton, 35	1	10½	2⅝	1	15½	2⅝	5/16	¼
Stanley, Steamer	none	.....	.....	none	.....	.....	5/16	5/16
Stearns-Knight	1	6⅝	1⅜	2	9, 21⅛	1⅜, 1⅜	.....	.....
Stevens-Duryea	1	4¾	1½	1	4 1/8	1½	.....	.....
Studebaker, L6	1	5¼	1	1	2½	1	¼	5/16
Studebaker, B6	1	9½	1¼	1	8¾	1½	¼	5/16
Studebaker, S6	1	9½	1½	1	8¾	1½	¼	5/16
Stutz	1	8	2	1	15	1¼	⅜	¼
Templar, 445	.....	9¼	1½	.....	7¾	1¼	5/16	5/16
Tulsa	1	12¼	2	1	17	2	5/16	.....
Velie, 34	.....	8	2¼	.....	13½	2¼	⅜	⅜
Velie, 48	.....	10½	1¼	.....	9	1¼	5/16	⅜
Westcott, C-38	1	4	1¼	1	4	1¼	.....	.....
Westcott, C-48	1	9	1½	1	2 7/16	1¼	5/16	¼
Willys-Knight, 20	.....	3	2 5/16	.....	5½	2¼	5/16	¼

Electrical Equipment for 1921 Passenger Cars

Motor Age Maintenance Data Sheet No. 183

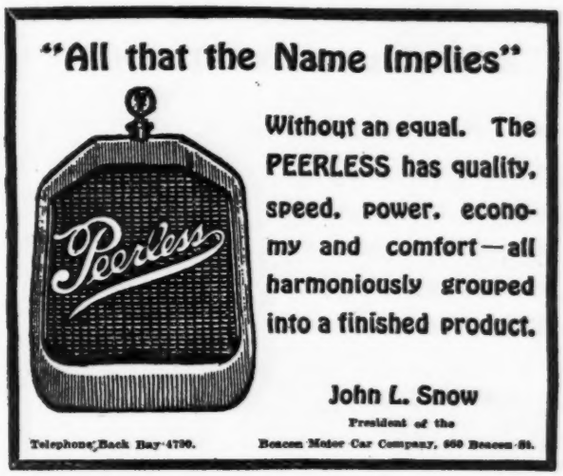
MAKE AND MODEL	Type of System	Voltage	Wiring	GENERATOR AND STARTER			IGNITION SYSTEM			Type of Battery Ignition
				Make	Charging Rate	Starter Engagement	Current Source	Make	Spark Control	
Ace, G	C	6-8	G. R.	Auto-Lite	10 amp. at 25 M. P. H.	Bendix	S. B.	Atwater Kent	hand	Closed Cir.
Allen, 43	C	6-8	G. R.	Westinghouse	14 amp. at 22 M. P. H.	Bendix	S. B.	Connecticut	hand	Closed Cir.
American, C	B	6-8	G. R.	Gray & Davis		Bendix	S. B.	Atwater Kent	hand	Closed Cir.
Anderson, 40	C	6-8	G. R.	Remy	17 amp. at 28 M. P. H.	Bendix	S. B.	Remy	hand	Open Cir.
Apperson, 8-21	A	6-8	Th. W.	Bijur	15 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Closed Cir.
Auburn, 6-39	A	6-8	G. R.	Remy	20 amp. at 37 M. P. H.	Bendix	S. B.	Remy	hand	
Beggs, 20-T		6-8		Auto-Lite		Bendix	S. B.	Connecticut	hand	Open Cir.
Bour Davis, 21-S	A	6-8	G. R.	Westinghouse	12 amp. at 12 M. P. H.	Bendix	S. B.	Westinghouse	hand	Open Cir.
Brewster, 21	B	12-16	Th. W.	U. S. L.	12 amp. at 21 M. P. H.	Magnetic	H. T. M.	Bosch	hand	
Briscoe, 4-34	A	6-8	G. R.	Auto-Lite	14 amp. at 33 M. P. H.	Bendix	S. B.	Connecticut	hand	Closed Cir.
Buick	D	6-8	G. R.	Delco	15 amp. at 25 M. P. H.	Sliding Gear	S. B.	Delco	hand and auto.	
Cadillac, 59	B	6-8	G. R.	Delco	14 amp. at 25 M. P. H.	Sliding Gear	S. B.	Delco	hand and auto.	
Case, V	A	6-8	G. R.	Westinghouse	13 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand and auto.	Closed Cir.
Chalmers	C	6-8	G. R.	Auto-Lite	12 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Closed Cir.
Chandler	A	6-8	T. W.	Bosch	13 amp. at 25 M. P. H.	Bendix	H. T. M.	Bosch	hand	
Chevrolet, 490	C	6-8	G. R.	Auto-Lite	7 amp. at 15 M. P. H.	Bendix	S. B.	Remy	hand	Closed Cir.
Chevrolet, FB		6-8		Auto-Lite	15 amp. at 28 M. P. H.	Bendix	S. B.	Remy	hand	
Cleveland, 40	A	6-8	G. R.	Bosch	14 amp. at 25 M. P. H.	Bendix	S. B., H. T. M.	Bosch	hand	
Climber, S	A	6-8	G. R.	Westinghouse	10 amp. at 8 M. P. H.	Bendix	H. T. M.	Bosch	hand	
Cole, 870	A	6-8	G. R.	Delco		Bendix	S. B.	Delco	hand and auto.	Open Cir.
Columbia Six	A	6-8	G. R.	Auto-Lite	10 amp. at 8 M. P. H.	Bendix	S. B.	Atwater Kent	hand	
Commonwealth, 44	A	6-8		Dyneto		Bendix	H. T. M.	Splitdorf	hand	
Crawford, 21-6-40	A	6-8	G. R.	Westinghouse	12 amp. at 36 M. P. H.	Bendix	S. B., H. T. M.	Bosch Atwater Kent	hand	
Cunningham, V-4	A	6-8	G. R.	Delco	14 amp. at 20 M. P. H.	Bendix	S. B.	Delco	auto.	Open Cir.
Daniels, D-19	A	6-8	G. R.	Delco	14 amp. at 20 M. P. H.	Mechanical	S. B.	Delco	hand	Open Cir.
Davis, 51	A	6-8		Delco	12 amp. at 15 M. P. H.	Bendix	S. B.	Delco	hand	
Dixie Flyer, HS	A	6-8	T. W.	Dyneto	15 amp. at 25 M. P. H.	Bendix	H. T. M.	Eisemann	hand	
Dodge Brothers	B	12-16	G. R.	North East	7½ amp. at 23 M. P. H.	Chain	S. B.	North East	auto.	Open Cir.
Dorris, 6-80	A	6-8	G. R.	Westinghouse	10½ amp. at 20 M. P. H.	Bendix	H. T. M.	Bosch	hand	
Dort, 17-A	A	6-8	G. R.	Westinghouse	16 amp. at 12 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Dupont, A	A	6-8	G. R.	Westinghouse	10 amp. at 15 M. P. H.	Bendix	H. T. M.	Eisemann	hand	
Elcar, 7-R	A	6-8	G. R.	Delco	12 amp. at 25 M. P. H.	Bendix	S. B.	Delco	hand	Open Cir.
Elgin, K	A	6-8	G. R.	Westinghouse	11½ amp. at 25 M. P. H.	Bendix	S. B.	Wagner	hand	Closed Cir.
Essex, A	A	6-8	G. R.	Delco	12 amp. at 15 M. P. H.	Sliding Gear	S. B.	Delco	hand and auto.	Closed Cir.
Ferris	A	6-8	G. R.	Leece Neville	10 amp. at 17 M. P. H.	Bendix	S. B.		hand	
Ford	A	6-8	G. R.	Ford	10 amp. at 15 M. P. H.	Bendix	S. B. & L. T. M.	Ford	hand	Open Cir.
Franklin, 9-B	B	12-16	Th. W.	Dyneto	12 amp. at 18 M. P. H.	Chain	S. B.	Atwater Kent	auto.	Closed Cir.
Friend Four	A	6-8	G. R.	Wagner	10 amp. at 15 M. P. H.	Bendix	S. B.	Connecticut	hand	Closed Cir.
Gardner, G	A	6-8	G. R.	Westinghouse	10 amp. at 25 M. P. H.	Bendix	S. B.	Westinghouse	hand	Open Cir.
Grant Six, HX	A	6-8	G. R.	Bijur	15 amp. at 25 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Halladay, 21	A	6-8	G. R.	Westinghouse	8 amp. at 15 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Open Cir.
Hanson, 60	C	6-8	G. R.	Delco	10 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand	Closed Cir.
Harroun, AA-2	C	6-8	G. R.	Remy	20 amp. at 15 M. P. H.	Bendix	S. B.	Remy	hand	Open Cir.
Hatfield, A-42	A	6-8	G. R.	Dyneto	10 amp. at 20 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Haynes, 47	C	6-8	G. R.	Leece Neville	15 amp. at 20 M. P. H.	Bendix	S. B.	Kingston	hand	Closed Cir.
H. C. S., Series 3	A	6-8	G. R.	Delco		Bendix	S. B.	Delco	hand	Open Cir.
Holmes, Series 4	B	12-16	Th. W.	Dyneto	12 amp. at 20 M. P. H.	Chain	H. T. M.	Eisemann	auto.	
Hudson, Super 6	B	6-8	G. R.	Delco	16 amp. at 23 M. P. H.	Sliding Gear	S. B.	Delco	hand and auto.	Closed Cir.
Hupmobile, R	A	6-8	G. R.	Westinghouse	12 amp. at 19 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Jackson, 6-38	A	6-8	G. R.	Auto-Lite	15 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Closed Cir.
Jorgan, M	A	6-8	G. R.	Delco	14 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand	Closed Cir.
Kenworthy, 8-90	A	6-8	G. R.	Bijur	15 amp. at 25 M. P. H.	Bendix	S. B.		hand	
King, H	A	6-8	G. R.	Westinghouse	10 amp. at 15 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Kissel Kar	C	6-8	G. R.	Remy	15 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Open Cir.
Kline Kar, 6-55-K	A	6-8	G. R.	Wagner	14 amp. at 15 M. P. H.	Bendix	S. B.	Connecticut	hand	Closed Cir.
Kurtz, A	A	6-8	G. R.	Westinghouse	10 amp. at 20 M. P. H.	Bendix	S. B.	Westinghouse	hand	
LaFayette, 134	B	6-8	G. R.	Delco	20 amp. at 35 M. P. H.	Mechanical	S. B.	Delco	hand and auto	Open Cir.
Leach	A	6-8	G. R.	Delco	12 amp. at 15 M. P. H.	Bendix	S. B.	Delco	hand	Open Cir.
Lincoln	B		G. R.	Delco	16 amp. at 20 M. P. H.	Mechanical	S. B.	Delco	hand and auto.	Closed Cir.
Lexington, S	A	6-8	G. R.	Gray & Davis	15 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Lexington, T	A	6-8	G. R.	Gray & Davis	15 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Liberty	C	6-8	G. R.	Wagner	16 amp. at 20 M. P. H.	Bendix	S. B.	Wagner	hand	
Locomobile, 48	A	6-8	G. R.	Westinghouse	7 amp. at 25 M. P. H.	Magnetic	H. T. M.	Berling	hand	
Lorraine, 21-T	A	6-8	G. R.	Westinghouse	18 amp. at 20 M. P. H.	Bendix	S. B.	Westinghouse	hand	Open Cir.
Maibohm, B	A	6-8	G. R.	Bijur	14 amp. at 25 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	
Marmon, 34	C	6-8	G. R.	Delco	12 amp. at 25 M. P. H.	Bendix	S. B.	Delco	hand and auto.	
McFarlan, 1921	C	6-8	G. R.	Westinghouse	15 amp. at 20 M. P. H.	Magnetic	S. B., H. T. M.	Berling	hand	
Mercer, V	A	6-8	G. R.	Westinghouse		Bendix	H. T. M.	Eisemann	hand	
Merit, B	A	6-8	G. R.	Westinghouse	10 amp. at 18 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Metz, M-6	A	6-8	G. R.	Gray & Davis		Bendix	S. B.	Connecticut	hand	
Meteor, R & RR	C	6-8	G. R.	Westinghouse	10 amp. at 10 M. P. H.	Bendix	H. T. M.	Simms	hand	
Mitchell, F40	A	6-8	G. R.	Remy		Bendix	S. B.	Remy	hand	
Moon, 6-48-21	A	6-8	T. W.	Delco	10 amp. at 25 M. P. H.	Bendix	S. B.	Delco	auto.	Open Cir.
Nash Four	A	6-8	G. R.	Wagner	10 amp. at 10 M. P. H.	Bendix	S. B.	Wagner	hand	
Nash, 681	A	6-8	G. R.	Wagner	12 amp. at 25 M. P. H.	Bendix	S. B.	Wagner	hand and auto.	Closed Cir.
National, BB	A	6-8	G. R.	Westinghouse	12 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand and auto.	Closed Cir.
Noma, 1-C	A	6-8	G. R.	Delco	12 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand	
Oakland, 34-C	A	6-8	G. R.	Remy	10 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Closed Cir.
Oldsmobile, 43-A	A	6-8	G. R.	Auto-Lite	12 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Closed Cir.
Overland, 4	C	6-8	G. R.	Auto-Lite	14 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Closed Cir.
Packard, S-6	A	6-8	Th. W.	Atwater-Kent	16 amp. at 20 M. P. H.	Bendix	S. B.	Delco	auto.	Closed Cir.
Packard, T-6	A	6-8	Th. W.	Bijur	16 amp. at 18 M. P. H.	Bendix	S. B.	Delco	auto.	
Paige, 6-42	A	6-8	G. R.	Gray & Davis	12 amp. at 15 M. P. H.	Bendix	S. B.	Atwater-Kent	hand and auto.	Closed Cir.
Paige, 6-66	A	6-8	G. R.	Gray & Davis	12 amp. at 15 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Pan American	A	6-8	G. R.	Westinghouse	20 amp. at 30 M. P. H.	Bendix	S. B.	Westinghouse	hand	Open Cir.
Paterson, 6-50	A	6-8	G. R.	Delco	10 amp. at 12 M. P. H.	Bendix	S. B.	Delco	hand	Open Cir.
Peerless, 56	A	6-8	T. W.	Auto-Lite	15 amp. at 20 M. P. H.	Bendix	S. B.	Atwater-Kent	hand and auto.	Closed Cir.
Piedmont, 4-30	A	6-8	T. W.	Dyneto	15 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand	Open Cir.
Piedmont, 6-40	A	6-8	T. W.	Remy	15 amp. at 20 M. P. H.	Bendix	S. B.	Remy	hand	Open Cir.
Pierce Arrow	A	6-8	G. R.	Delco		Mechanical	S. B.	Delco	hand and auto.	Closed Cir.
Pilot, 6-50	A	6-8	G. R.	Bijur		Bendix	S. B.	Connecticut	hand	Closed Cir.
Porter, 46	A	12-16	G. R.	Westinghouse	10 amp. at 12 M. P. H.	Bendix	H. T. M.	Berling	hand	
Premier, 6-D	C	6-8	G. R.	Delco	15 amp. at 15 M. P. H.	Bendix	S. B.	Delco	hand	
Raleigh, A-6-60	A	6-8	G. R.	Westinghouse	12 amp. at 15 M. P. H.	Bendix	H. T. M.	Bosch	hand	
Ranger	A	6-8	G. R.	Bijur	6 amp. at 10 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Reo, T-6	A	6-8	G. R.	North East		Bendix	S. B.	North East	hand	Closed Cir.
R. & V. Knight, J	A	6-8	G. R.	Wagner	10 amp. at 15 M. P. H.	Benidx	S. B.	Wagner	hand	Closed Cir.
R. & V. Knight, R	A	6-8	G. R.	Wanger	10 amp. at 15 M. P. H.	Bendix	S. B.	Wagner	hand	Closed Cir.

MAKE AND MODEL	Type of System	Voltage	Wiring	GENERATOR AND STARTER			IGNITION SYSTEM			Type of Battery Ignition
				Make	Charging Rate	Starter Engagement	Current Source	Make	Spark Control	
Roamer, 6-54-D	A	6-8	G. R.	Bijur	10 amp. at 25 M. P. H.	Magnetic	H. T. M.	Bosch	hand	
Rock Falls, 14000	A	6-8	G. R.	Westinghouse	12 amp. at 18 M. P. H.	Bendix	H. T. M.	Bosch	hand	
Saxon, 125	A	6-8	G. R.	Wagner	12 amp. at 20 M. P. H.	Bendix	S. B.	Wagner	hand and auto.	Closed Cir.
Sayers Six, DP	A	6-8	G. R.	Delco	12 amp. at 20 M. P. H.	Bendix	S. B.	Delco	hand	Open Cir.
Scripps Booth, B39	C	6-8	G. R.	Remy	20 amp. ar 23 M. P. H.	Bendix	S. B.	Remy	hand	Open Cir.
Skelton, 35	A	6-8	G. R.	Westinghouse	12 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Standard	A	6-8	G. R.	Westinghouse	12 amp. at 15 M. P. H.	Bendix	H. T. M.	Splitdorf	hand	
Stanwood Six	A	6-8	T. W.	Westinghouse	10 amp. at 20 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Open Cir.
Stearns-Knight	A	12-16	G. R.	Westinghouse	10 amp. at 10 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Stephens, 90	C	6-8	G. R.	Auto-Lite	12 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Stevens-Duryea, E	A	6-8	G. R.	Westinghouse		Magnetic	S. B., H. T. M.	Berling	hand	
Studebaker, EJ, L-6	A	6-8	T. W.	Wagner, Remy	15 amp. at 12 M. P. H.	Bendix	S. B.	Wagner, Remy	auto.	Closed Cir.
Studebaker, EH, S-6	A	6-8	G. R.	Wagner	17 amp. at 12 M. P. H.	Chain	S. B.	Wagner	hand	Open Cir.
Studebaker, EG, B-6	A	6-8	G. R.	Wagner	17 amp. at 12 M. P. H.	Chain	S. B.	Wagner	hand	Open Cir.
Stutz	A	6-8	G. R.	Remy	16 amp. at 23 M. P. H.	Sliding Gear	S. B.	Delco	hand	
Templar, 445	A	6-8	G. R.	Bijur	15 amp. at 30 M. P. H.	Bendix	H T. M.	Simms	hand	
Tulsa, E-1-2-3	C	6-8	G. R.	Dyneto	14 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Open Cir.
Velie, 48	A	6-8	G. R.	Bijur	14 amp. at 20 M. P. H.	Bendix	S. B.	Atwater-Kent	hand and auto.	Closed Cir.
Velie, 34	A	6-8	G. R.	Westinghouse	14 amp. at 20 M. P. H.	Bendix	S. B.	Atwater-Kent	hand	Closed Cir.
Wasp, 211	A	6-8	G. R.	Westinghouse	10 amp. at 15 M. P. H.	Bendix	S. B., H. T. M.	Bosch	hand	
Westcott, C-38	A	6-8	G. R.	Delco	14 amp. at 30 M. P. H.	Bendix	S. B.	Delco	hand and auto.	Open Cir.
Westcott, C-48	A	6-8	G. R.	Delco	14 amp. at 30 M. P. H.	Bendix	S. B.	Delco	hand and auto.	Open Cir.
Willys Knight	C	6-8	G. R.	Auto-Lite	14 amp. at 25 M. P. H.	Bendix	S. B.	Connecticut	hand	Closed Cir.
Winton Six, 25	A	6-8	T. W.	Bijur	10 amp. at 20 M. P. H.	Bendix	H. T. M.	Delco	hand	

A—Generator, Motor and Ignition Separate. B—Generator, and Motor combined. C—Generator and Ignition combined. D—Generator, Ignition and Motor combined. T. W.—Two Wire. Th. W.—Three Wire. G. R.—Grounded Return. S. B.—Storage Battery. H. T. M.—High Tension Magneto. L. T. M.—Low Tension Magneto. Auto.—Automatic. Closed Cir.—Closed Circuit Open Cir.—Open Circuit.

Effective Advertising by Peerless Representative

"Ready to Roll"
Peerless
We have in our showrooms a few more handsome Sedans and Coupes—fully equipped, ready to roll away. Cash or time payments.
John L. Snow
President of the
Telephone Back Bay 4790.
Beacon Motor Car Company, 660 Beacon St.


"All that the Name Implies"
Peerless
Without an equal. The PEERLESS has quality, speed, power, economy and comfort—all harmoniously grouped into a finished product.
John L. Snow
President of the
Telephone Back Bay 4790.
Beacon Motor Car Company, 660 Beacon St.

"MAKE your advertising distinctive and it will tell its story." That is what John L. Snow, in charge of the Peerless sales in Boston, believes in doing, and he has been successful. When the Beacon Motor Car Company, the corporate name of his firm, started the month of August all the 1922 Peerless cars were in the hands of buyers, with the exception of a lone Sedan delayed by the railroad strike.

Moreover, this year his sales were 50 per cent greater than a year ago, and they showed an increase over 1920, the big rush year for cars. Snow, who dates back for 20 years or more with Peerless, and who won races with his cars as well as selling them in the early days, states that salesmanship and advertising, plus a splendid car are the reasons for his success.

The Peerless Motor Car Co. is a believer in National advertising. Therefore its policy is to do this on its own account, and the dealers pay for their own copy in the newspapers. This allowed Snow to do things a little differently from other dealers. He believes motor advertising is a necessity, but some of the copy placed in the papers by various companies does not appeal to him.

In working out his plans he had a definite idea in mind. Do not say much. Make it snappy. Appeal to the new buyer and attract the old owner. Place the copy where it may be seen. Make your car distinctive so it can be recognized on the highways.

All this he has done. The Peerless radiator is placed in each advertisment. The copy is uniform in size—50 lines double column. The type selected is black enough without being too conspicuous. And the copy appears on the first pages of the Boston papers.

Each morning readers get a Peerless message in some of the papers. By alternating, the copy is there somewhere day after day. And, the front page prices being $1.50 to $2 a line, the cost is as much as advertisments twice as large in the inside pages. But people reading the headlines on the first page are greeted by Peerless like an old friend.

A number of the Boston dealers have commented favorably on this style of advertising. In each advertisment there is some little message a bit different from what has appeared previously. And being only 25 or 30 words the reader cannot help reading it. That it has brought results Mr. Snow knows from customers and from his salesmen, the latter being able to trace results and to feel the difference in impetus when the full schedule is running, and when it is not. Occassionally he runs an advertisment inside just to vary the position, but 90 per cent are first page copy.

The best evidence of his success is the big Peerless building erected a dozen years ago for the company, and which was instrumental in making Kenmore station, at Commonwealth avenue, Brookline avenue and Beacon street, the starting point of the new Motor Row in Boston. And the factory officials have more than once complimented their representative on his original manner of advertising Peerless.

The ACCESSORY SHOW CASE

New Sources of Retail Profit

BEC-MAR SPARK PLUG

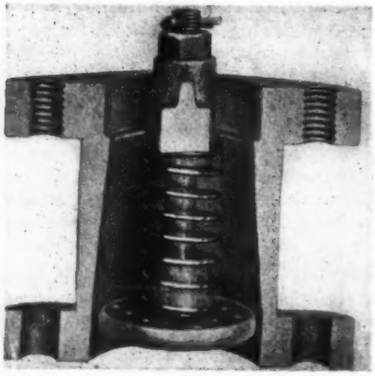
The feature of this spark plug is the fact that the spark is plainly in view in the top of the plug while the motor is in operation, thus affording an opportunity of checking up on the ignition. Bec-Mar Mfg. Co., 109 Sylvan ave., Newark, N. J.

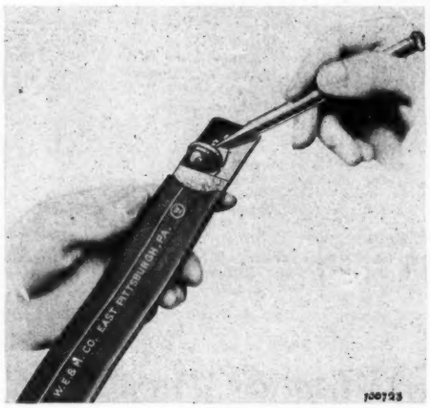
FITS-ALL SOCKET WRENCH

The Fits-All Socket Wrench fits every nut on a Ford and 90 per cent of the nuts on all other cars. Price $1. Fits-All Wrench Co., Providence, R. I.

McCANNA GOVERNOR

The McCanna Governor and additional gas mixer to the carbureter is said to prevent racing of the motor and to hold the car at any speed desired. E. H. Klemm, 1445 Austin ave., Chicago.





WESTINGHOUSE SPACE HEATER

The Westinghouse Electric & Mfg. Company announce the development of a space heater suitable for many purposes among which are mentioned heating of metals, heating water tanks, baking and drying ovens, protecting windows from frost, warming garages or other purposes where a temperature in excess of 80 degrees Fahr. is not required. For battery stations it might be applied in the construction of ovens for melting battery compound.

HELMET TRAFFIC SIGNAL

The Helmet Traffic Signal is made of pressed steel, black enameled and nickel trimmed. Size 4½ by 5½ by 3 in. A "stop" contact switch on the brake pedal, that may be released with the brake on, prevents the continual flashing of the "stop" signal on each depression of the brake. The "left" and "right" turns are indicated by the arrows which are controlled by two buttons which can be mounted anywhere to suit the driver. The cut shows these buttons mouned on the floor board. Williamson Mfg. Co., Baltimore, Md.

KUMFORD KLUTCH FOR FORDS

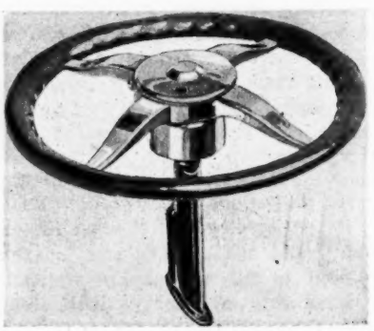
Kumford Klutch is a small device which is made of malleable iron that will hold the clutch pedal of a Ford in low gear without the driver's foot being pressed to the pedal. $3. E. G. Overly, Greensburg, Pa.

NECKTIES FOR FORDS

This is a rod with brackets at each end to fit across the bottom of the Ford radiator to relieve it of strain. Price $2.50 each. Steam Tractor Auto and Mfg. Co., 219 West 7th st., Sioux City, Ia.

SENG WHEEL LOCK FOR FORDS

Seng Wheel Lock for Fords is an all-steel wheel lock, every exposed and working part being case hardened. No Ford parts are removed in installation. Price $15. W. P. Seng, 1131 Bryn Mawr ave., Chicago.



COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Columbus, O.	Columbus Auto Dealers Co.	Aug. 28-Sept. 3
Decatur, Ill.	Industrial Exhibition and Automobile Show	Aug. 30-Sept. 9
Peoria, Ill.	Nat'l. Implement and Vehicle Show	Sept. 4
Minneapolis, Minn	Minnesota State Fair	Sept. 2-9
Indianapolis	Indianapolis Automobile Trade Assn.	Sept. 4-9
Wilmington, Del.	Delaware State Fair	Sept. 4-9
Hartford, Conn.	Connecticut Fair Grounds	Sept. 4-9
Spokane, Wash.	Annual Show	Sept. 4-9
Ottawa, Can.	Central Canada Exhibition	Sept. 8-18
Syracuse, N. Y.	New York State Fair	Sept. 11-16
Cleveland	Closed Car Exhibit—Cleveland Automobile Manufacturers & Dealers' Association	Sept. 18-28
Memphis	Memphis Automobile Dealers' Assn.	Sept. 23-30
New York	Closed Car Show—Automobile Merchants' Association	Sept. 23-30
Detroit	Enclosed Car Solon at General Motors Bldg., Detroit Automobile Dealers' Assn.	Oct. 17-21
Wash'gton, City of	Closed Car Salon	Oct. 21-28
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
Cincinnati, O.	Second Annual Automobile and Radio Exposition	Nov. 23-29
New York	National Automobile Body Builders' Show	Jan. 8-13
New York	Annual Show	Jan. 6-13
Cleveland, O.	Annual Winter Show, Cleveland Automobile M'f'r's. and Dealers' Assn.	Jan. 20-27
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Minneapolis, Minn	Annual Show	Feb. 3-10

CONVENTIONS

Toledo, O.	Annual Convention, Ohio Automobile Trades Assn.	September
Buffalo, N. Y.	M. A. M. A. Fall Convention	Sept. 13-15
Chicago	Show Managers' Assn.	Sept. 14-15
Santa Barbara	Annual Convention, California Automotive Trades Assn.	October
Chicago	Nat'l. Association of Farm Equipment Manufacturers	Oct. 18-20

FOREIGN SHOWS

Berlin	Kaiserdamm Hall	Sept. 25-Oct. 3
Rio de Janiero	Automotive Exhibition	Sept., 1922
London	International Commercial Vehicle Exhibition	Oct. 12-13
Paris, France	Automobile Show	Oct. 4-15
London	Annual Show	Nov. 3-11

RACES

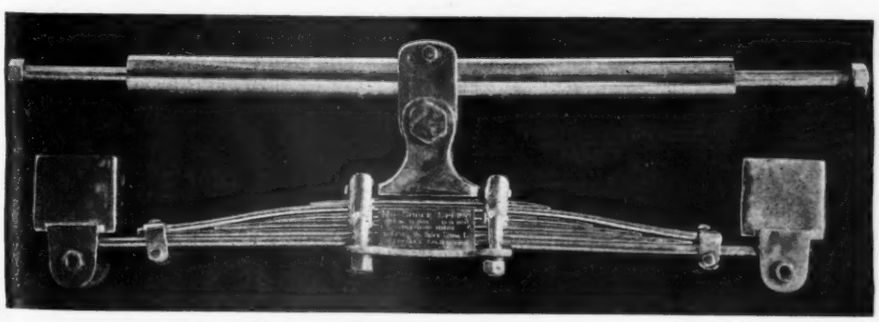
Milan, Italy	Monza Speedway Automobile Club of Milan—500 Mile Race	Sept. 3
Colo. Spgs., Colo.	Pike's Peak Race	Sept. 4
Kansas City	Opening Meet of New Kansas City Board Speedway	Sept. 16
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

No-Shock Spring Affords Three Point Suspension

A spring suspension which is in reality an adaptation of the platform type of spring to the front end of a motor car has been produced in Berkeley, Cal., by the No Shock Spring Co.

The principal object is to provide a suspension which will afford a three point suspension mounting for the frame upon the running gear of the vehicle and will at the same time act to prevent distortion of the frame, to keep the body at all times level, and to eliminate undue strain. The device consists of a pair of spring members, i. e., torsion spring, secured to the axle, the forward ends of these spring members carrying a semi-elliptical spring, secured to the vehicle frame at each end by means of shackles, and provided with a central pivot, which, in turn, supports the body of the car by connection with that body at each end of a tubular cross bar.

The No-Shock Spring in action when the car runs into the gutter or into a ditch, showing the manner in which the car body is held level



The No-Shock Spring ready for attachment. It has been tried out on 27 different makes of cars and one truck, and found successful on all. Two men can attach it in one hour without pit or crane

DOING ONE THING WELL

Before turning a car which has been in the shop over to the customer, let a man go over it to make sure it is right for delivery. The mechanical work may have been done as well as it is possible to do, but is the car presentable in its present form?

Mechanics who work on greasy floors all day are sure to get much of this grease on their shoes, which in turn gets onto the running boards or floor boards of the car. Grease may get on the steering wheel rim, but it shouldn't stay there. Let one man's job be to clean the car before delivery. It will take only 5 minutes to go over the car. Let him wipe off the windshield, the steering wheel and control levers, fenders, running boards and floor boards. All he needs is water, a sponge, rags, kitchen cleanser and a desire to please the customer.

CORRECTION

In MOTOR AGE of July 27 a price list of trucks was given as that of the Power truck when it should have been that of the Tower truck manufactured at Greenville, Mich. The Power truck is manufactured by the Power Truck and Tractor Co. of St. Louis. It is made in two models, a 2 ton truck listing at $3,275 and a 3½ ton truck at $4,200, both equipped with starting and lighting systems and enclosed cab.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾-1	$1650a	3¾x5	34x5n	34x5n	W
Acason....RB	1½	1950	3¾x3½	36x3½	36x6	W
Acason....H	2½	2750	4½x5¾	36x4k	36x8k	W
Acason....L	3½	3450	4½x5¾	36x5k	36x10k	W
Acason....M	5	4350	5 x6¼	36x6	40x12	W
Aco....C	1½	2295	3¾x5¼	34x3½k	34x5k	W
Aco....A	2½	2795	4¼x5½	36x4k	36x7	W
Acme....20	1	....	3¾x5	35x5n	35x5n	W
Acme....30	1½	....	3¾x5	34x3½	34x5	W
Acme....40	2	....	3¾x5	34x3½	34x5	W
Acme....60	3	....	4½x5¼	36x4	36x7	W
Acme....60L	3	....	4½x5½	36x4	36x7k	W
Acme....90	4½	....	4½x5½	36x5	40x10	W
Acme....125	6¼	....	4¾x6	36x6	40x12	W
American....25	2½	3350	4 x6	33x4k	36x4dk	W
American....40	4	4275	4½x6	36x5k	36x5dk	W
Armleder....20	1	....	3¾x5¼	34x3½k	34x6k	W
Armleder....21	1½	....	3¾x5¼	34x3½k	34x6k	W
Armleder....40-B	1½	....	4¼x5½	34x3½k	34x6k	W
Armleder....40-C	1½	....	4¼x5½	34x3½k	34x6k	W
Armleder..HW-B	2½	....	4¼x5½	36x4k	38x7k	W
Armleder..HW-C	2½	....	4¼x5¼	36x4k	36x7k	W
Armleder..KW-B	3½	....	4½x6	36x5k	36x5dk	W
Armleder..KW-C	3½	....	4½x5½	36x5k	36x5dk	W
Atlas....MD	1	1185	3½x5	32x4½n	32x4½n	W
Atterbury....20R	1½	2475	3¾x5	34x3½	34x5	W
Atterbury....22C	2½	3375	4½x5¼	36x4	36x4d	W
Atterbury....22C	2½	3375	4½x5¼	36x4	36x4d	W
Atterbury....22D	3½	4375	4½x5½	36x5	40x5d	W
Atterbury....22D	3½	4275	4½x5½	36x5	40x5d	W
Atterbury....8E	5	4975	4¾x6	36x5	40x6d	W
Atterbury....8E	5	5125	4¾x6	36x5	40x6	W
Autocar....21UF	1½-2	1950	4¼x4½t	34x4k	34x5k	D
Autocar....21UG	1½-2	2050	4¾x4½t	34x4k	34x5k	D
Autocar....27H	2	2950	4 x5½	34x5	36x7	D
Autocar....27K2	2	3075	4 x5½	34x5	36x7k	D
Autocar....26Y	5	3950	4¼x5½	34x6	36x12	D
Autocar....26-B	5	4100	4½x5½	34x6	36x12	D
Available....H1½	1½	2475	4 x5	36x3½k	36x5k	W
Available....H2	2	2775	4 x5	36x3½k	36x6k	W
Available....H2½	2½	3160	4 x5	36x4k	36x8k	W
Available....H3½	3½	4175	4½x5½	36x5	40x5d	W
Available....H5	5	5375	5 x6	36x6	40x12	W
*Avery	1	....	3 x4	34x5n	34x5n	I
Beck....A Jr.	1¼	1285a	3½x5	34x4½n	34x4½n	I
Beck....B-30	1½	1725	3¾x5	34x5	36x6	
Beck....C-40	2	1810	3¾x5	36x6	36x6	
Beck....D-50	2½	2395	4½x5¼	38x7	40x8	
*Bell....(Penn.)	½	1000b	3½x5	31x4n	31x4n	B
Bell....M (Iowa)	1	1495	3½x5½	35x5	35x5n	W
Bell....E (Iowa)	1½	2100	3¾x5¼	34x3½	31x5	I
Bell....O (Iowa)	2½	2550	4½x5½	34x4	34x6	I
Belmont....A	½	725	3¾x4¼	31x4	31x4	B
Belmont....D	2	2575	4¼x5½	34x3½k	31x6k	I
Belmont....F	3	3500	4 x6	36x5k	36x5dk	I
Bessemer....G	1	....	3½x5	35x5n	35x5n	I
Bessemer....H-2	1½	....	3¾x5	36x3½	36x5	I
Bessemer....J-2	2½	....	4½x5¼	36x4	36x4d	I
Bessemer....K-2	4	....	4½x5½	36x5	36x10	I
Bethlehem....KN	1	1195	3½x5	35x5n	35x5n	B
Bethlehem....GN	2	1595	4 x5½	36x6k	40x8k	D
Bethlehem....HN	3	2195	4 x5¼	36x6k	42x9k	D
Brinton....C	2	2500	3¾x5	34x4	34x5	W
Brinton....D	3	2975	4½x5¼	36x4	36x7	W
Brockway....E	1	....	3¾x5½	35x5n	35x5n	B
Brockway....S-5	1½	....	3¾x5	36x4	36x6	W
Brockway....SK	1½	....	4¼x5¼	36x4	36x6	W
Brockway....KR	2½	....	4½x5½	36x4	36x8	W
Brockway....K-5	2½	....	4½x5¼	36x4	36x8	W
Brockway....RT	3½	....	4¾x6	36x5	36x10	W
Brockway....R-4	3½	....	4½x5½	36x5	36x5d	W
Brockway....T-4	5	....	4¾x6	36x6	40x6d	W
*Buick	½	945b	3½x4¾	31x4n	31x4n	B
Capitol....G1½	1½	2975	3¾x5	35x5	38x7	W
Capitol....H2½	2½	3700	4¼x6	36x4	38x8	W
Capitol....K2½	2½	4250	4½x6	36x6	42x9	W
Capitol....M3½	3½	4425	4½x6	36x5	36x10	W
Case	2	....	4¼x5¾	36x6	38x7	I
2Chevrolet	¼	510b	3⅛x4	30x3½n	30x3½n	B
*Chevrolet....G	¾	650	3⅛x4	31x4n	34x4½n	B
*Chevrolet	1	1095	3⅛x5¼	33x4n	35x5n	W
Chicago....C1½	1½	....	4 x5	36x3½k	36x5k	W
Chicago....C2½	2½	....	4 x5	36x4k	36x7k	W
Chicago....C3½	3½	....	4½x5¼	36x5	36x10	W
Chicago....D5	5	....	4½x5½	36x6	40x12	W
Clydesdale....10	¾-1¼	1485	3¾x5	34x5n	34x5n	B
Clydesdale....18	¾-1¼	1890	3¾x5	34x5	34x5	W
Clydesdale....20	1-1½	2385	3¾x5	34x5	34x5k	W
Clydesdale....42	1½-2	2475	3¾x5	36x3½	36x6	W
Clydesdale....65X	2½-3	3250	4½x5¼	36x4	36x8	W
Clydesdale..65EX	2½-3	3450	4½x5½	36x4	36x8	W
Clydesdale....90	3½-4½	4100	4½x5½	36x5	36x10	W
Clydesdale....120	5-6	4500	4¾x6	36x6	40x12	W
Columbia....H	1½	1995	4 x5	35x5	38x7n	I
Columbia....G	2½	2335	4 x5¼	36x4	36x7	I
Comet....T	1½	1950	3¾x5	34x4	34x4	W
Commerce....T	¾-1½	1450	3¾x5	34x4½n	34x4½n	B
Commerce....12	1½	1800	3¾x5	35x5n	35x5n	I
Commerce....16	2	2150	3¾x5	35x5n	36x6n	I
Commerce....18	2½	2495	4½x5¼	36x6n	40x8n	I
Commerce....25	2½	2425	4½x5½	36x4	36x7	W
Cook....51	2½	3600	4 x5½	36x6n	40x8n	W
Corbitt....E-22	1	1480	3¾x5	34x3½	34x4	W
Corbitt....D-22	1½	$2200	3¾x5	34x3½	34x5	W
Corbitt....C-22	2	2600	4¼x5¼	36x3½	36x7	W
Corbitt....B-22	2½	3000	4½x5¼	36x4	36x7	W
Corbitt....R-22	3	3200	4½x5½	36x4	36x8	W
Corbitt....A-22	3½-4	3800	4½x5½	36x5	36x10	W
Corbitt....AA-22	5	4500	4¾x6	36x6	40x6d	W
Day-Elder....AS	1	1600	3¾x5	35x5n	35x5n	W
Day-Elder....B	1½	2000	3¾x5	34x3½	34x5	W
Day-Elder....D	2	2400	4¼x5¼	36x4	36x7	W
Day-Elder....C	2½	2750	4¼x5½	36x4	36x7	W
Day-Elder....F	3½	3150	4½x5½	36x5	36x5d	W
Day-Elder....E	5	4250	4½x6	36x5k	40x6dk	W
Dearborn....E	1	1600	3¾x5½	35x5n	35x5n	W
Dearborn....FX	1½	2300	3¾x5½	34x4	34x5	W
Dearborn....F	1½	2180	3¾x5½	34x4	34x5	W
Dearborn....48	2	2590	3¾x5½	34x4½n	34x7	W
Defiance....G	1	1695a	3¾x5	35x5n	35x5n	B
Defiance....D	1½	2095a	3¾x5	35x5n	36x6n	I
Defiance....E	2	2275a	3¾x5	35x5n	38x7n	I
Denby....31	1¼	1485	3½x5	35x5n	35x5n	B
Denby....33	1½	2145	3¾x5	35x5n	38x7n	I
Denby....34	2	2395	3¾x5	36x3½	36x6	I
Denby....35	2½-3	2795	4½x5¼	36x4	36x7	I
Denby....27	4	3895	4½x5½	36x5	36x5d	I
Denby....210	5	4295	4½x5½	36x6	40x6d	I
Dependable....A	¾-1	1650	3½x5½	34x5n	36x6n	W
Dependable....C	2	2350	3¾x5¼	34x3½	34x5	W
Dependable....D	2½	2650	4 x5½	34x5	36x6	W
Dependable....E	3	2950	4¼x5½	36x4	36x7	W
Diamond T....O-3	1-1½	1975	3¾x5¼	36x3½n	36x4n	W
Diamond T....T	1½	2250	3¾x5¼	36x3½	36x5	W
Diamond T....U	2-2½	2650	4 x5½	36x4	36x7	W
Diamond T....K	3½	3750	4¼x5½	36x5	36x5d	W
Diamond T....EL	5	4325	4½x5½	36x6	40x6d	W
Diamond T....S	5	4500	4¾x6	36x6	40x6d	W
*Diehl	1	....	3½x5	34x4½	35x5	I
Diehl	1½	....	3½x5	36x6	36x6	I
Doane	2½	4100b	4¼x5¾	36x5	36x7	C
Doane	3½	5100b	4¾x5¾	36x5	36x5d	C
Doane	6	6000b	5 x6¼	36x6	40x6d	C
*Dodge Brothers	¾	730	3⅞x4½	32x4n	32x4n	B
Dorris....K-4	2-2½	3400	4¼x5½	36x4	36x7	W
Dorris....K-7	3½	4400	4¼x5½	36x5	36x10	W
*Dort	½	685a	3½x5	31x4n	31x4n	B
Double Drive....B	3	4000	4¼x5½	6	6	W
Duplex....A	2	2775	4 x5½	35x5n	38x7n	W
Duplex....E	3½	3500	4¼x5½	36x8	36x8	I
Eagle....101	1½	1875	3½x5½	34x5	34x5	I
Eagle....100-2	2	2275	3¾x5¼	34x4k	34x7k	I
F. W. D....B	3	4200	4¾x5½	36x6	36x6	B
Fageol....1½	1½	3000	3¾x5¼	34x3½k	34x6k	W
Fageol....2½	2½	3900	4¼x5¾	34x4	36x7	W
Fageol....3½	3½	5000	4½x6¼	36x5k	40x5dk	W
Fageol....5	5	5700	4½x6¼	36x6	40x6d	W
Fargo....R	2	1700	3¾x5	34x6	36x6	I
*Federal....R2	1	1375	3¾x5	33x5n	33x5n	W
Federal....SD	1½	1800	3¾x5	35x5n	36x6n	W
Federal....TE	1½	2175	4½x5½	36x3½	36x5	W
Federal....UE	2-2½	2425	4½x5¼	36x4	36x7	W
Federal....WE	3½-4	3150	4½x5½	36x5	36x5d	W
Federal....X2	5-6	4500	4¾x6	36x6	40x6d	W
*Ford....TT	1	430	3¾x4	30x3½n	32x4½n	W
Front Drive....C	1½	2800	3¾x5½	5	4	W
G & J**....20	1	2275	3⅝x5½	34x5n	34x5n	W
G & J**....A	2-2½	3375	4x5¼	36x4	36x7	W
G & J**....B	3½-4	4475	4½x5½	36x5	36x10	W
G.M.C....K16	1	1295	3½x5½	34x5n	34x5n	B
G.M.C....K-41A	2	2375	4 x5½	36x4k	36x7k	W
G.M.C....K-41B	2	2375	4 x5½	36x4k	36x7k	W
G.M.C....K41-T	2	2450	4x5½	36x4	36x8	W
G.M.C....K-71A	3½	3600	4½x6	36x5	40x5d	W
G.M.C....K-71B	3½	3700	4½x6	36x5	40x5d	W
G.M.C....K71-T	3½	3700	4½x6	36x5	40x12	W
G.M.C....K-101A	5	3950	4½x6	36x5	40x6d	W
G.M.C....K101-T	5	4050	4½x6	36x5	40x14	W
G.M.C....K-101B	5	4050	4½x6	36x5	40x6d	W
G.W.W	1½	1850	3¾x5½	35x5	35x5	I
*Garford....15	1	1590	3⅝x5½	34x5n	34x5n	W
Garford....25-B	1½	1990	3¾x5½	36x3½	36x5	W
Garford....70-H	2½	2750	4¼x5½	36x4	36x8	W
Garford....77-D	4	3750	4½x6	36x5	36x5d	W
Garford....68D	5	4500	5 x6½	36x6	40x6d	W
Garford....150-A	7½	5200	5 x6½	36x6	40x7d	C
Gary....F	1-1½	1675	3¾x5	36x3½	36x5	W
Gary....I	2	2250	4 x5½	36x3½	36x6	W
Gary....J	2½	2650	4¼x5½	36x4	36x8	W
Gary....K	3½	3650	4½x6	36x5	40x5d	W
Gary....M	5	4100	5 x6½	36x6	40x6d	W
Gersix....M	1½	3100	4 x5½	36x3½	36x7	W
Gersix....K	2½	3500	4½x5½	36x4	36x8	W
Gersix....B	3½	$4500	4½x6	36x5	40x12	W
Graham Bros....	1	1265	3¾x4½n	33x4½n	34x5n	B
Graham Bros....	1½	1325	3¾x4½n	33x4½n	36x6n	B
1Gramm-Pion..10	1	1245	3½x5	33x5n	33x5n	B
1Gramm-Pion..15	1½	1750a	3¾x5	36x3½k	36x5k	I
1Gramm-Pion..65	1¾	2250a	3¾x5	36x3½k	36x5k	W
1Gramm-Pion..20	2	2475a	4¼x5¼	36x4k	36x7k	W
1Gramm-Pion..30	3	3300a	4¼x5½	36x4k	36x4dk	W
1Gramm-Pion.75P	3½	4225a	4½x5½	36x6n	42x9n	W
1Gramm-Pion..40	4	3850a	4½x5½	36x5	36x5dk	W
1Gramm-Pion..50	5-6	4450a	4¾x6	36x6	40x6dk	W
Hahn....B2	1	1750	3½x5	34x5k	34x5k	W
Hahn....O	1½	2150	3¾x5¼	36x3½k	36x6k	W
Hahn....K	2	2550	4¼x5½	36x4k	36x7k	W
Hahn....L	3	3350	4½x5½	36x5k	36x8k	W
Hahn....M	5	3850	4½x5½	36x5	36x10	W
Hahn....N	6	4250	4¾x6	36x6	40x12	W
Hal-Fur....E	1½	2350	4x5½	34x5n	38x7n	W
Hal-Fur....B	2½	3000	4¼x5½	36x6n	36x8	W
Hal-Fur....F	3½	4000	4½x5½	36x6n	40x10	W
Hall....1½	1½	3100	3¾x5	34x5n	38x7n	W
Hall....2½	2½	3275	4¼x5¼	36x4	36x6	W
Hall....3½	3½	4100	4½x5½	36x5	36x5d	W
Hall....5	5	5100	4½x5½	36x5	40x6d	W
Hall....7 chain	7	5100	4½x5½	36x5	40x6d	C
Harvey....WOA	2	2650	4¼x5½	34x4	34x7	W
Harvey....WFA	2½	2950	4¼x5½	36x4	36x7	W
Harvey....WHA	3½	3950	4½x6	36x5	36x5d	W
Hawkeye....K	1½	1850	3¾x5½	34x3½k	34x5k	I
Hawkeye....M	2	2650	4¼x6	36x4k	36x6k	I
Hawkeye....N	3½	3700	4½x6¾	36x5k	36x10k	I
Hendrickson....O	1½	2200	3⅝x5½	36x4n	36x5n	W
Hendrickson....N	2½	2690	4¼x5¾	36x4k	36x7k	W
Hendrickson....M	3½	3000	4¼x5	36x5k	36x5dk	W
Hendrickson....K	5	4000	5 x6¼	36x6	40x6	W
Huffman....B	1½-2	1795	3¾x5¼	34x3½	34x6	W
Huffman....C	1½-2	1695	3¾x5½	36x3½	36x6	I
Huffman....D	2-3	2895	4¼x5½	36x4	36x7	
Hurlburt....A-A	1-1½	1950	3¾x5	34x5n	34x5n	W
Hurlburt....B-B	2-2½	2800	4¼x5½	36x4	36x4d	W
Hurlburt....C-C	3-3½	3475	4¼x5½	36x5	36x5d	W
Hurlburt....D-D	4-4½	4150	4½x6	36x5	36x6d	W
Hurlburt....E-E	6-6½	4850	4¾x6½	36x6	40x6d	W
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	I
Indep'd't(Iowa).G	1½	2040	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.) .H1	2½	2940	4¼x5¼	36x4	36x7	I
Indep'd't(Ohio). F	1½	2385	3¾x5	36x3½	36x5	W
Indep'd't(Ohio) H	2½	3085	4¼x5¼	36x4	36x4d	W
Indep'd't(Ohio) K	3½	3985	4½x5½	36x5	36x5d	W
Indiana....12	1½-2	....	3¾x5¼	34x3½k	34x5k	W
Indiana....20	2	....	4½x5½	36x4k	36x7k	W
Indiana....25	2½-3	....	4½x5½	36x4k	36x8k	W
Indiana....35	3½-4	....	4½x5½	36x5k	36x5dk	W
Indiana....51	5-7	....	5 x6¼	36x6k	40x6dk	W
*International....S	1	1250	3½x5	34x5n	34x5n	I
International....21	1	1550	3½x5¼	36x3½	36x3½	I
International....31	1½	1650	3½x5¼	36x3½	36x4	I
International....41	2	2100	3½x5¼	36x3½	36x5	I
International....61	3	2400	4¼x5	36x4	36x6	I
International....101	5	3600	4¼x5	36x5	40x10	I
Jackson....4WD	3½	3850	4½x5½	36x7	38x7	B
Jumbo....15	1½	2295	3¾x5¼	36x3½	36x5	I
Jumbo....20	2	2520	3¾x5¼	35x5n	38x7n	I
Jumbo....25	2½	2660	4½x5½	36x4	36x7	I
Jumbo....30	3	3060	4¼x5½	36x6n	42x9n	I
Jumbo....35	3½	3900	4½x6	36x5	36x10n	I
Jumbo....40	4	4400	4½x6	38x7n	44x10	I
K-Z....1	1	1750	3½x5	34x3½	34x5	W
K-Z....1½	1½	2075	3¾x5	36x4	36x6	W
K-Z....2½	2½	2550	4¼x5¼	36x4	36x8	W
K-Z....3½	3½	3350	4½x5½	36x5	40x10	W
K-Z....5	5	3850	4½x5½	36x6	40x6d	W
Kalamazoo....T	1	1295	4 x5	34x5	34x5n	B
Kalamazoo....G-1	1½	1800	3¾x5	34x4	34x5	W
Kalamazoo....LG	2	2645	4 x5	36x4	36x7	W
Kalamazoo....NH	3	3145	4 x6	36x5	36x10	W
Kalamazoo....HD	3	3350	4¼x6	36x5	36x10	W
Kalamazoo....SK	4	3845	4¼x6	36x5	36x12	W
Kalamazoo....OK	5	4350	4½x6	36x6	40x6d	W
2Kelly-S....K-31	1½	2700	3¾x5¼	36x3½	36x6	C
2Kelly-S....K-34	1½	2700	3¾x5¼	36x3½	36x6	W
2Kelly-S....K-38	2½	2900	3¾x5¼	36x4	36x4d	W
2Kelly-S....K-35	2½	2900	3¾x5¼	36x4	36x4d	C
2Kelly-S....K-40	3½	3900	4½x6½	36x5	40x5d	C
2Kelly-S....K-41	3½	3900	4½x6½	36x5	36x10	I
2Kelly-S....K-42	3½	3900	4½x6½	36x5	40x5d	W
2Kelly-S....K-59	5	4400	4½x6½	36x6	40x6d	W
2Kelly-S....K-60	6	4600	4½x6½	36x6	40x7d	C
2Kelly-S....K-61	5-7	4800	4½x6½	36x6	36x7d	I
Keystone....40	2	2175	3¾x5½	34x5n	38x7n	I
Kimball....AB	2	3675	4 x6	36x4	36x7	W
Kimball....AC	2½	3975	4¼x6	36x4	36x8	W
Kimball....AK	3	4500	4½x6	36x4	36x10	W
Kimball....AE	4	5000	4¾x6	36x5	40x12	W
Kimball....AF	5	5500	5 x6	36x6	40x7d	W
*Kissel....Express	1	1585	3¾x5¼	34x5n	34x5n	W
Kissel....Utility	1½	1975	3¾x5½	36x3½	36x5	W
Kissel....Freighter	2½	2875	4¼x5½	36x4	36x7	W
Kissel....H. D.	4	3675	4½x5½	36x5	36x5d	W
Kleiber....AA	1	2200	4¼x5¼	34x3½k	34x5k	W
Kleiber....A	1½	3100	4½x5¼	36x3½k	36x6k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm. r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor.

1—Gramm-Pioneer. 2—Kelly-Springfield.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kleiber.....BB	2	$3600	4½x5¼	36x4k	36x7k	W
Kleiber.....B	2½	3950	4½x5½	36x5k	36x8	W
Kleiber.....C	3½	4600	4½x5½	36x5	36x5d	W
Kleiber.....D	5	5300	5 x6½	36x6	40x12	W
Koehler.....D	1½	2150	3½x5	34x3½	31x5	W
Koehler.....M	2½	3175	4 x5¼	36x4	36x7	W
Koehler.....MCS	2½	3275	4 x5¼	36x4	36x7	W
Koehler.....F	3½	4470	4½x5½	36x5	36x10	W
Koehler,MT. Trac	5	3275	4 x5⅛	36x4	36x7	W
Krebs.....23	¾	1260	3¼x5	34x4½	34x4½	B
Krebs.....24	1	1505	3¾x5	34x5	34x5	W
Krebs.....4S	1½	2125	4½x5¼	36x4	36x7	W
Krebs.....75	2½	2375	4½x5½	36x4	36x8	W
Krebs.....110	3½	2975	4½x5½	36x5	40x10	W
Larrabee.....X-2	1	1025	3¼x4½	34x5n	34x5n	B
Larrabee.....U	1½	2100	3¾x5	34x3½	34x5	W
Larrabee.....J	1½-2½	2400	3¾x5	34x3½k	34x5k	W
Larrabee.....K	2½-3	3100	4½x5¼	36x4	36x7	W
Larrabee.....K-5	2½-3½	3450	4½x5½	36x4	36x8	W
Larrabee.....L-4	3½-5	4000	4½x5½	36x5	36x5d	W
Larrabee.....W	5-7	4800	4½x6	36x6	40x6d	W
Maccar.....L	1½	....	4½x5½	36x4	36x6	W
Maccar.....H-A	2	....	4½x5¼	36x4	36x4d	W
Maccar.....H-2	3	....	4½x5½	36x4	36x5d	W
Maccar.....M-3	4	....	4½x5½	36x5	36x6d	W
Maccar.....G	5-6	....	4¾x6	36x5	40x6d	W
MacDonald.....A	7½	5750	4½x6	40x7	40x14	I
Mack...AB D.R.	1½	3150	4 x5	36x4	36x3½d	D
Mack...AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack...AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack...AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack...AB D.R.	2½	3850	4 x5	36x4	36x4d	D
Mack...AB Chain	2½	3400	4 x5	36x4	36x4d	C
Mack...AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack...AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack...AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack...AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac...AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac...AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac...AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac...AC	13	5750	5 x6	36x6	40x12	C
Mack Trac...AC	15	6000	5 x6	36x7	40x7d	C
*Mapleleaf...**	1½	3000	3¾x5¼	34x5n	36x6n	W
Mapleleaf...AA**	2	3600	4 x5¼	36x4	36x7	W
Mapleleaf...BB**	3	4050	4½x5½	36x4	36x4d	W
Mapleleaf...CC**	4	4800	4½x5½	36x5	36x5d	W
Mapleleaf...DD**	5	5625	4½x5½	36x6	40x6d	W
Master.....JW	1½	2290	4½x5½	34x3½	34x5	W
Master.....JD	1½	2590	4½x5½	34x3½	34x5	D
Master.....Z	2	2290	4½x5¼	34x3½	34x5	W
Master.....W	2½	2890	4½x5½	34x4	36x7	W
Master.....DD	2½	3190	4½x5½	34x4	36x7	D
Master.....A	3½	3990	4½x6	36x5	40x5d	W
Master.....E	3½	4290	4½x6	36x5	40x5d	D
Master.....Y	4	4490	4½x6	36x5	40x6d	D
Master.....B	5	4990	4¾x6½	36x6	40x6d	W
Master.....F	5	5090	4¾x6½	36x6	40x6d	D
MasterTrac.,DDT	0	3390	4½x6	34x4	36x7	D
*Maxwell.....1½	1½	932	3½x4½	32x3n	32x4n	W
*Menominee.....	1	1650	4 x5	34x5n	34x5n	W
Menominee...HT	1-1¼	2000	3¾x5	34x3½	36x5	W
Menominee....H	1½	2175	4 x5	36x3½	36x5	W
Menominee....D	2-2½	2875	4 x6	36x4	36x8	W
Menominee....G	3½	3800	4½x6	36x5	36x10	W
Menominee...J-3	5	4250	4½x6	36x6	40x12	W
Moline.....10	1½	1985	3½x5	34x5n	36x6n	I
3Moreland..R. R.	1	1595	4 x5	34x5n	34x5n	B
Moreland.....BX	1½	1980	4 x5	36x3½	36x6k	W
Moreland.....EX	2	2800	4½x5¼	36x4	36x7k	W
Moreland.....AX	3	3500	4½x5½	36x5	36x10k	W
Moreland.....RX	4½-5	4600	4½-6	36x6	40x6	W
Nash.....2018	1-1½	1595	3¾x5¼	34x3k	34x4k	I
Nash.....3018	2-2½	2150	3¾x5¼	34x4k	34x7k	I
Nash.....Quad	2-2½	2750	4¼x5½	36x5k	36x5k	I
Nash..3018, LWB	2-2½	2200	3¾x5¾	34x4k	34x7k	I
Nash..Quad, LWB	2-2½	2800	4¼x5½	36x5k	36x5k	I
Nash.....5018	2½	2250	3¾x5¼	34x4k	34x7k	I
4Nelson.....G2	1½	....	4½x5¼	36x3½	36x6	W
4Nelson.....G3	2½	....	4½x5¼	36x4	36x7	W
4Nelson.....G4	3½	....	4½x5½	36x5	36x5d	W
4Nelson.....G5	5	....	4¾x6	36x6	40x6d	W
Netco.....DK	2	3100	4½x5¼	36x4k	36x7k	W
Netco.....HL	2½	3500	4½x5½	36x4k	36x8k	W
Niles.....E	2	3000	4½x5¼	36x4k	36x7k	W
Noble.....A21	1¾	1840	3½x5½	34x5	34x5	W
Noble.....B31	1½-2	2480	3¾x5¾	36x4	36x7	W
Noble.....D51	2½-3	2950	4¼x5½	36x4	36x8	W
Noble.....E71	3½-5	3800	4½x6	36x5	36x10	W
Noble.....B39	1½	....	3¾x5¼	36x3½	36x5	W
Noble.....C40	2	....	4 x5½	36x4	36x7	W
Noble.....D50	2½	....	4¼x5½	36x4	36x8	W
Noble.....E70	3½	....	4½x6	36x5	36x10	W
Northwestern..W	1½	2700	4½x5¼	34x4	36x6	W
Northwestern.WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk.....25E	1	1595	3½x5	34x3½	34x4	W
Norwalk.....35E	1½	1925	3½x5	34x3½	34x3½d	W
Norwalk,35E.Spec	1½	2285	3¾x5¼	34x3½	34x5	W
Ogden.....A2	1	....	3½x5	34x5n	34x5n	W
Ogden.....D	1½	....	3¾x5	36x3½	36x5	W
Ogden.....E	2½	....	4½x5¼	36x4	36x8	W

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Old Hickory...W	1	$1775	3¾x5	36x3½k	36x4k	W
Old Reliable.....A	1½	2350	4 x5	34x4	36x6	W
Old Reliable.....B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable.....C	3½	4250	4½x6	36x5	36x5d	W
Old Reliable.....D	5	5000	4¾x6	36x6	40x6d	W
Old ReliableKLM	7	6000	4¾x6¼	36x6	40x7d	C
*Oldsmobile Econ	1	1095	3½x5¼	35x5n	35x5n	I
Olympic.....A	2½	3200	4¼x5½	36x4	36x8	W
Oneida.....B9	1½	2825	4 x5¼	36x3½	36x7	
Oneida.....C9	2½	3700	4 x5¼	36x4	36x8	
Oneida.....D9	3½	4050	4½x5½	36x5	36x10	
Oneida.....E9	5	4725	4½x5½	36x6	40x12	
Oshkosh.....A	2	3250	3½x5	36x6n	36x6n	B
Oshkosh.....AA	2	3400	3½x5	36x6n	36x6n	B
Oshkosh.....B	2½	3850	4 x5½	38x7n	38x7n	B
Oshkosh.....BB	2½	4000	4 x5½	38x7n	38x7n	B
*Overland.....4	½	450	3¾x4	30x3½n	30x3½n	B
Packard.....EC	2-3	3100	4¼x5½	36x4	36x7	W
Packard.....EX	2-2½	3100	4¼x5½	36x6n	40x8n	W
Packard.....ED	3½-4½	4100	4½x5½	36x5	36x5d	W
Packard.....EF	5-7½	4500	5 x5½	36x6	40x6d	W
Paige.....52-19	1½	1950	4 x5¼	34x3½	34x5	W
Paige.....54-20	2½	2420	4¼x5½	34x4	34x8	W
Paige.....51-18	3½	3145	4½x5½	36x5	36x5d	W
Parker.....C-22	1	1875	3¾x5¼	34x5n	34x5n	W
Parker.....G-22	2½	3200	4¼x6	34x4	36x4d	W
Parker.....J-20	3½	3950	4½x6	36x5	40x5d	W
Parker.....M-20	5	4850	5 x6	36x6	40x6d	W
Patriot... Revere	1	1380	3¾x5	35x5n	35x5n	W
Patriot... Lincoln	2	2050	4 x5¼	34x3½	34x5	W
Patriot .Washgt'n	3	2900	4½x5½	36x4	36x7	W
Pierce-Arrow.....	2	3200	4 x5½	36x4	36x4d	W
Pierce-Arrow.....	3½	4350	4½x6¾	36x5	36x5d	W
Pierce-Arrow.....	5	4850	4½x6¾	36x5	40x6d	W
Pittsburgher.....	1½-2	3000	3¾x5	36x4	36x6	..
Pittsburgher.....	3	3800	4½x5¼	36x5k	36x8	W
Power.....F	2	3150	4 x5¼	36x5	36x7	W
Power.....C	3½	4250	4¼x5½	36x5	40x10	W
Premocar...B-143	1½	2475	3½x5	36x6n	36x6n	W
*Rainier.....R-21	¾	....	3½x5	35x5n	35x5n	W
Rainier.....R-29	1	....	3¾x5	34x3½	34x4	W
Rainier.....R-26	1½	....	3¾x5	34x3½	34x5	W
Rainier.....R-28	2	....	4½x5¼	34x4	34x6	W
Rainier.....R-20	2½-3	....	4½x5½	34x4	34x7	W
Rainier.....R-15	3½-5	....	4½x5½	36x5	36x5d	W
Rainier.....R-17	5-6	....	4¾x6	36x6	40x6d	W
Ranger...TK-20-2	1½	2450	3¾x5	36x6n	38x7n	W
*Reo.....F	¾-1½	1245	4½x4½	34x4½n	34x4½n	B
Reliance.....10A	1½	2400	4 x5¼	36x3½	36x5	I
Reliance.....20B	2½	3100	4¼x5½	36x4	36x4d	I
Republic.....75	¾	1395b	3½x5	32x4½n	32x4½n	I
Republic.....10	1	1395	3¾x5	34x3	34x4	I
Republic..10 Exp	1	1695	3¾x5	34x5n	34x5n	I
Republic.....11X	1½	1795	3¾x5	34x4	34x6	I
Republic.....19	2½	2195	4½x5½	36x4	36x7	I
Republic.....20	3½	3095	4½x5½	36x5	36x10	I
Rowe.....CW	1½	3000	3¾x5	36x6n	36x6n	W
Rowe...C.D.W.	2	3300	4 x5	34x4	36x3½d	W
Rowe...G.S.W.	3	4150	4 x6	34x5	36x5d	W
Rowe...G.P.W.	3	5250	3½x5r	38x7n	42x9n	W
Rowe.....HW	4	4500	4½x6	36x5	36x6d	W
Rowe.....F. W.	5	5500	4½x6	36x6	40x6d	W
Ruggles.....20	1	1195	3¾x5	34x5n	34x5n	B
Ruggles.....40	2	1795	4 x5	34x5n	34x7	D
Samson.....15	¾	....	4-3½x4	32x4n	32x4n	B
Samson.....25	1¼	....	4-3½x5½	35x5n	35x5n	B
Sanford....W-15	1½-2	2150b	3¾x5	36x3½k	36x5k	..
Sanford.....25	2½-3½	....	4½x5½	36x4	36x4d	W
Sanford.....35	3½-5	....	4½x5½	36x5	36x5d	W
Sanford.....50	5-7	....	4¾x6	36x5	40x6d	W
Schacht....2-Ton	2	3200	4¼x5½	36x4	36x7	W
Schacht....3-Ton	3	3800	4½x5½	36x5	36x5d	W
Schacht....4-Ton	4	4200	4½x6	36x5	40x5d	W
Schacht....5-Ton	5	4400	4½x6	36x5	40x6d	W
Schacht....7-Ton	7	5050	4½x6	36x6	40x7d	W
Schwartz.....A	1	1685	3½x5	34x4½n	34x4½n	B
Schwartz.....K	2	3000	3¾x5¼	34x3½	34x7	W
Schwartz.....L	3	3600	4¼x5½	36x4	36x8	W
Schwartz.....M	5	4900	4½x6	36x6	40x12	W
Selden.....30	1½-2½	2250	3¾x5	34x3½	34x5	W
Selden.....31	1½-2½	3350	4½x5¼	34x5a	38x7n	W
Selden.....50	2½-3½	3250	4½x5½	36x4	36x7	W
Selden.....51	2½-3½	4350	4½x5½	36x6n	40x8n	W
Selden.....70	3½-5	3750	4½x5½	36x5	36x10	W
Selden.....90	5-7	4950	4½x6	36x6	40x12	W
Seneca.....M	½	820	3½x4½	30x3½n	30x3½n	B
*Service.....12	¾	....	3¼x4½	32x4½n	32x4½n	B
*Service.....15	1¼	....	3½x5	34x4½n	35x5n	B
Service.....21	1½	....	3½x5½	34x3½	34x5	W
Service.....32	2	....	4 x5½	36x3½	36x7	W

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Service.....37	2	....	4¼x5½	35x5n	38x7n	W
Service.....52	3	....	4¼x5½	36x4	36x8	W
Service.....72	3½	....	4¼x5½	36x5	36x5d	W
Service.....77	4	....	4½x6	36x5	36x5d	W
Service.....102	6	....	4½x6	36x6	40x6d	W
Signal.....NF	1	$1450	3¾x5	34x5n	36x6n	W
Signal.....H	1½	1950	4¼x5¼	34x4	36x6	W
Signal.....J	2½	2375	4½x5¼	34x4	36x8	W
Signal.....M	3½	3175	4½x5½	36x5	40x5d	W
Signal.....R	5	3900	4¾x6	36x6	40x6d	W
Southern.....10	1	2090	3¾x5	34x3½	34x4	W
Southern.....15	1½	2590	3¾x5½	36x6n	34x4	W
Southern.....20	2	2990	4¾x5¼	36x6n	40x8k	W
*Standard.....75	1¼	1330	3¾x5	33x5n	33x5n	W
Standard.....1-K	1½	1600	3¾x5	34x3½k	31x5k	W
Standard.....76	2½-3	2400	4½x5¼	36x4k	36x7k	W
Standard.....66	3½-5	3150	4½x5½	36x5	36x10	W
Standard.....5-K	5-7	4400	4¾x6	36x6	40x12	W
*Star.....	½	610b	3½x4¼	30x3½n	30x3½n	B
Sterling.....1½	1½	2885	4 x5¼	36x3½k	36x5k	W
Sterling.....2	2	3085	4 x5¾	36x4k	36x6k	W
Sterling.....2½	2½	3290	4¾x5¾	36x4k	36x4dk	W
Sterling.....3½	3½	4325	4½x6¼	36x5k	40x8dk	W
Sterling.....5-W	5	4950	5 x6¼	36x6	40x6d	W
Sterling.....5-C	5	5500	5 x6¼	36x6	40x6d	C
Sterling.....7½	7½	6000	5 x6¼	36x6	40x7d	C
*Stewart...Utility	¾-1½	1245	3½x5½	34x4½n	34x4½n	I
Stewart.....15	1½-1½	1445	3½x5½	35x5n	35x5n	I
Stewart.....9	1½-2	1790	3¾x5	34x3½	34x5	I
Stewart.....7	2-2½	2190	4½x5¼	34x4	34x7	I
Stewart.....7-X	2½-3	2390	4¼x5½	34x4	34x7	I
Stewart.....10	3½-4	3190	4½x5½	36x5	36x5d	I
Stewart.....10-X	3½-4	3190	4½x6	36x5	36x5d	I
*Stewart.....	1¼	1245	4-3½x5½	34x4½	34x4½	
*Stoughton.....C	¾	1240	3½x5	34x4½n	34x4½n	B
Stoughton.....A	1	1790	3¾x5¼	34x5n	34x5n	W
Stoughton.....B	1½	2150	3¾x5½	36x3½	36x5	W
Stoughton.....D	2	2490	4 x5½	36x4	36x7	W
Stoughton.....F	3	3150	4½x5½	36x5d	36x5d	W
Sullivan.....E	2	2800	4½x5½	36x4k	36x7k	W
Sullivan.....H	3½	3750	4½x6	36x5	36x5d	W
*Thomart.....	1¼	1795a	4 x5¼	34x5	34x5	C
Tiffin.....GW	1½	2100	4½x5¼	36x3½	36x5	W
Tiffin.....MW	2½	2700	4½x5¼	36x4	36x3½d	W
Tiffin.....PW	3½	3600	4½x5½	36x5	40x5d	W
Tiffin.....PW	5	4300	4¾x6	36x6	40x6d	W
Tiffin.....UW	6	4500	4¾x6	36x6	40x12	W
Titan.....	2	2750	4 x5	36x4k	36x7k	D
Titan.....	2½	2950	4¼x5½	36x4k	36x8k	D
Titan.....	3½	3950	4½x6	36x5k	40x10k	D
Titan.....	5	4550	4½x6	36x5	40x12	D
Tower.....J	1½	2000a	4½x5¼	35x5n	38x7n	W
Tower.....H	2½	2475a	4½x5¼	36x4	36x7	W
Tower.....G	3½	3475a	4½x5½	36x5	36x5d	W
Traffic.....	1½	1595	3¾x5	35x5n	35x5n	I
Traffic.....C	2	1595	3¾x5	34x3½k	34x5k	I
Traffic.....	3	1895a	3¾x5	36x4	36x7	I
*Transport.....15	1	1295	3¾x5	32x4½n	32x4½n	B
Transport.....25	1½	1495	3¾x5½	34x3½k	34x4k	I
Transport.....35	2	1885	3¾x5	36x3½k	36x6k	I
Transport.....55	3	2385	4¼x5¼	36x4k	36x8k	I
Transport.....69	3½	2585	4¼x5½	36x4k	36x8k	I
Transport.....75	5	3485	4½x6	36x5k	36x12k	I
Traylor.....B	1½	2390	3¾x5½	34x3½	34x5	W
Traylor.....C	2-2½	2850	4 x5½	36x4	36x7	W
Traylor.....D	3-3½	2300	4¼x5½	36x4	36x8k	W
Traylor.....F	5-6	4700	4½x6	36x6	40x6d	W
*Triangle.....AA	1	1285	3¼x5	34x4½n	34x4½n	I
Triangle.....A	1½-2	1985	3¾x5¼	34x3½k	34x6k	I
Triangle.....C	2-2½	2285	3¾x5½	36x4k	36x7k	I
Triangle.....B	2½-3	2585	4 x5¾	36x4k	36x7k	I
Twin City...B.W.	2	2750	4 x5½	36x6	40x8	I
Twin City...AW.	3½	3950	4¼x6	36x5	40x5d	W
5Twin City.....B	3½	....	5½x6	36x6	36x6	I
5Twin City.....A	5	....	5½x6	36x7	36x7	I
Ultimate.....A	2	3150	4 x5½	36x3½	36x6	W
Ultimate.....AJ	2	3200	4¼x5½	36x3½	36x6	W
Ultimate.....AJL	2	3250	4¼x5½	36x3½	36x6	W
Ultimate.....B	3	3700	4¼x5½	36x4	36x4d	W
Ultimate.....BL	3	3800	4¼x5½	36x4	36x4d	W
Ultimate.....D	5	5500	5 x6½	36x6	40x12	W
Union.....FW	2½	3190	4 x6	36x5k	36x8k	D
Union.....HW	4	4650	4½x6	36x6	40x12	D
United.....A	1½	2145	3¾x5½	36x3½k	34x5k	W
United.....B	2½	3150	4¼x5½	36x4k	36x7k	W
United.....C	3½	3975	4¼x5½	36x5	36x5d	W
United.....V	5	4500	4½x6	36x6	40x6d	W
*United States..U	1¼	1800	3¾x5½	34x5n	34x5n	B
UnitedStates,NW	1½-2	2375	3¾x5	36x5	36x3½	W
United States...N	1½-2	2175	3¾x5	36x3½k	36x5k	I
United States...R	3	3300	4 x5¼	36x4	36x4d	W
United States...S	4	4975	4½x5½	36x5	36x5d	W
United States...T	5-7	4975	4¾x6½	36x6	40x6d	W
Velie.....46	1½	1585	3¾x5	36x3½k	36x5k	I
Veteran.....M**	1½	2699	3¾x5¼	35x5n	35x5n	W
Veteran.....P**	2	3699	4¼x5½	36x4	36x7	W
Veteran.....R**	3	4200	4¼x5½	36x4	36x7	W
Veteran.....S**	4	5395	4½x6	36x5	36x10	W
*Vim.....29	½	1050	3½x4½	31x4n	31x4n	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express, truck or delivery wagon. **—Canadian Make. trac.—tractor.

3—Moreland Road Runner. 4—Nelson Le Moon. 5—Twin City Four Wheel Drive.

Specifications of Current Motor Truck Models—Continued

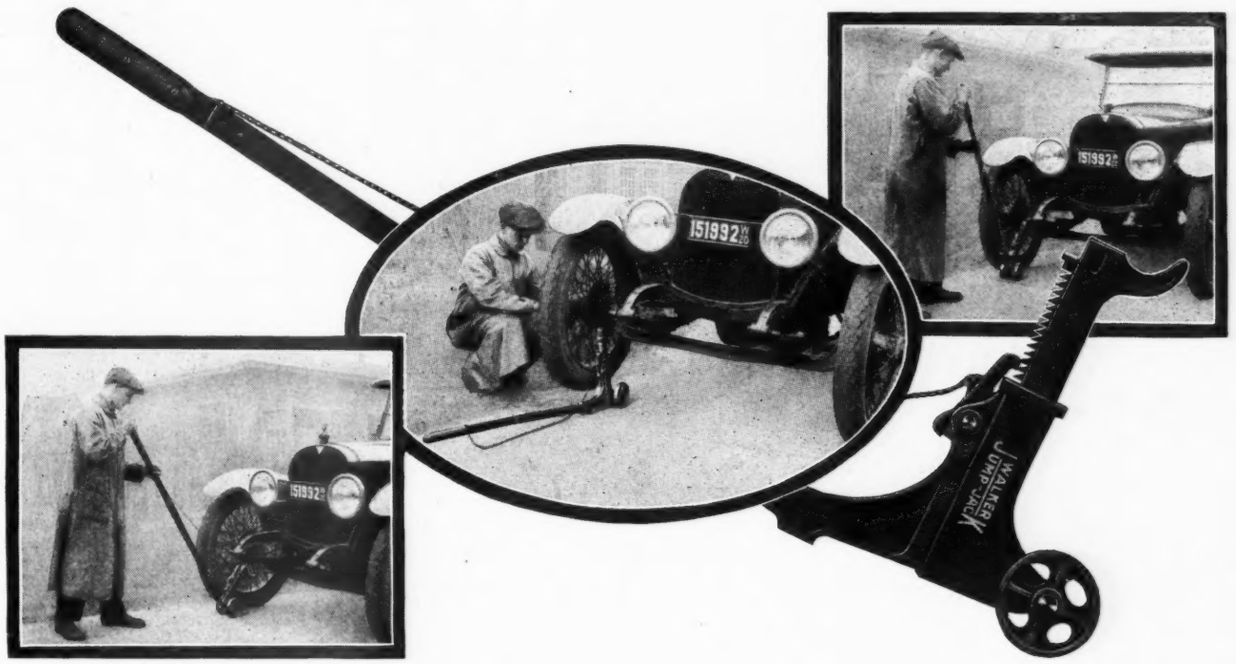
NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Vim	30	1½	$1175	3½x4½	32x4½	32x4½	W
*Vim	50	1½-3¼	995	4 x5	32x4n	32x4n	B
Vim	31	1	1975	3¾x5½	35x5n	35x5a	W
Vim	22	2	3150	3¾x5½	36x4	36x6	W
Vim	23	3	3950	4¼x5½	36x5	36x5d	W
Walker-JohnsonA	2		2250	3¾x5	34x3½	34x6	W
Walker-JohnsonB	3		2750	4¼x5½	36x4	36x8	W
Walter	M	2½	3850	4½x5¾	36x4	36x8	D
Walter	S	5	4850	4½x6¼	36x6	40x6d	W
*Watson	C	1	1465a	3½x5½	35x5n	35x5n	W
Watson	N	3½	4250	4½x5½	36x5	36x10	W
Western	W1½	1½	2550	4½x5¼	36x3½k	36x5k	W
Western	L1½	1½	2550	3¾x5	36x3½k	36x5k	W
Western	W2½	2½	3250	4½x5¼	36x4	36x7	W
Western	L2½	2½	3250	4¼x6	36x4	36x7	W
Western	W3½	3½	4250	4½x6	36x5	40x5d	W
*White	15	¾	2400	3¾x5½	34x5n	34x5n	B
White	20	2	$3250	3¾x5½	30x4k	36x7k	B
White	40	3½	4200	3¾x5¾	36x5	40x5d	D
White	45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick	E	1	1225	3¾x5	34x5n	34x5n	W
White Hick	H	1½	1375	3¾x5	36x3½	36x5	W
White Hick	K	2½	1675	4¼x5¼	36x4	36x5	W
Wichita	K	2	1875	3¾x5¼	36x3½	36x4k	W
Wichita	M	1	2400	3¾x5¼	36x3½k	36x6k	W
Wichita	RX	3	3200	4¾x5¾	36x4k	36x8k	W
Wichita	O	4	$3500	4½x6¼	30x5k	36x5k	W
Wilcox	AA	1	1900	3¾x5½	36x4k	36x4k	W
Wilcox	BB	1½	2550	4¼x5	36x4	36x5	W
Wilcox	D	2½	3000	4¼x5	36x4k	36x3½dk	W
Wilcox	E	3½	3950	4½x6	36x5k	36x5dk	W
Wilcox	F	5	4350	4¾x6½	36x5	40x6d	W
Wilson	F	1½	2270	3¾x5	36x3½	36x5	W
Wilson	EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson	G	3½	3685	4½x5½	36x5	36x5	W
Wilson	H	5	4520	4¾x6	36x6	40x6	W
*Wisconsin	A	1	1750	3¾x5	34x5n	34x5n	W,B
Wisconsin	B	1½	2100	3¾x5	35x5	36x6	W
Wisconsin	C	2½	2700	4 x5¾	36x6n	36x7	W
Wisconsin	D	3½	3000	4¾x5¾	36x6n	40x8	W
Wisconsin	E	5	3500	4½x6¼	36x6	36x10	W
Wisconsin	F	7	4000	5 x6¼	36x6	36x12	W
Witt-Will	N	1½	2450	3¾x5	36x3½k	36x5k	W
Witt-Will	P	2½	2900	4½x5¼	36x3½k	36x7k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm. r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires. k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
Allis-Chal.G.P	6-12	$250	2	LeR.	4-3½x4½	Gas.	1
Allis-Chalm	15-25	1185	4	Midw.	4-4½x5¼	Gas.	3
Allis-Chalm	20-35	1885	4	Own	4-4¾x6½	GorK	3-4
‡Allis-Chalm	20-35	2085	4	Own	4-4¾x6½	G	4
Allwork	2-G	14-28	1595	4	Own	4-4¾x6	GorK	3
Allwork	C	14-28	1395	4	Own	4-5 x6	GorK	3
¶ARO.1921-22	3-6	385	4	Own	1-4½x5	Gas.	1
Aultman-T		15-30	1900	4	Clim.	4-5 x6½	G,K	4
Aultman-T		22-45	2800	4	Own	4-5½x8	G,K	6
Aultman-T		30-60	4000	4	Own	4-7 x9	G,K,D	8-10
Automot. B-3		12-24	1250	4	Here.	4-4 x5½	Gas.	2-3
Avery,SR.Cul		5-10	....	4	Own	4-3 x4	G,K	..
Avery Cult-C		....	....	3	Own	6-3 x4	G,K	..
Avery B		5-10	....	4	Own	4-3 x4	G,K	2
Avery C		....	....	4	Own	6-3 x4	G,K	..
Avery		8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery		12-20	....	4	Own	4-4½x6	G,K,D	3-4
§Avery		....	....	*	Own	4-4x5½	G,K,D	3
Avery		12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery		14-28	....	4	Own	4-4½	G,K,D	3-4
Avery		18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery		25-50	....	4	Own	4-6½x7	G,K,D	5-6
Avery		45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates Mule H		15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule, F		18-25	....	*2	Midw	4-4½x5¼	Gas.	3
‡Bates MuleG		25-35	....	*2	Midw	4-4½x6	Gas.	..
Bear		25-35	4250	*2	Ste.	4-4¾x6½	Gas.	4
¶Beeman	G	2-4	240	4	Own	1-3½x4½	Gas.	..
Best		30	....	*2	Own	4-4¾x6½	G,K,D	4
Best		60	....	*2	Own	4-6½x8½	G,K,D	8-9
Boring		5-10	395	4	LeR.	4-3½x4½	G	..
Boring	1921	.....	1850	3	Wauk	4-4¾x5¾	GorK	2
**Bryan		15-30	....	4	Own	2-4 x5	K.	3
Capital		15-30	1000	2	Own	4-4¼x6	Gas.	3
Case		12-20	1050	4	Own	4-4½x5	G,K,D	3
Case		12-20	....	....	....	4-4½x5	....	2
Case		15-27	1320	4	Own	4-4½x6	G,K,D	3-4
Case		22-40	2550	4	Own	4-5½x6¾	G,K,D	4-5
Case		40-72	5200	4	Own	7 x8	G,K,D	8-10
Caterpillar T35		15	....	*2	Own	4-4 x5½	Gas.	3
Caterpillar .5T		25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar 10T		40	....	*2	Own	4-6½x7	Gas.	6
Centaur		5-2½	345	2	N Way	2-4½x4½	GorK	1
Chicago	40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac	F	9-16	595	*2	Own	4-3½x4½	G,K,D	2
Cletrac	W	12-20	1345	*2	Own	4-4 x5½	G,K,D	2-3
Dakota	4	15-27	1500	3	Dem.	4-4¾x6	Gas.	3
Depue	A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill	D	20	2380	4	Cont.	4-4½x5½	Gas.	3
Dill	R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3
Do-it-All	A	3-6	495	..	Own	1-4½x5	Gas.	1
Eagle	F	12-22	....	4	Own	2-7 x8	GorK	3-4
Eagle	H	16-30	....	4	Own	2-8 x8	G or K	4-5
E-B	AA	12-20	1095	4	Own	4-4¾x5	G,K,D	3
Fageol	D	9-18	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse	B	18-30	1885	4	Clim.	4-5 x6½	G,K	4
Farquhar		15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar		18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar		25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch	4 Drive	20-35	1850	4	Clim.	4-5 x6½	GorK	3-4
Fordson		-18	$ 395	4	Own	4-4x5	G,K	2
Franklin	G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-4
Franklin	C	18-30	3350	*2	Clim.	4-5 x6½	G or K	3-4
Franklin	G2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick	A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick	C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
Grain Belt	A	18-36	2150	4	Wauk.	4-4¾x6¾	G or K	4
Gray		20-36	1975	3	Wauk.	4-4½x3¼	Gas.	4
Gray		22-44	2165	3	Wauk.	4-5 x5¼	Gas.	4-5
Gt. Western St		20-30	1950	4	Beav.	4-4¾x6	K	4
Hart-Parr	20	20	765	4	Own	2-5¼x6½	K,D.	2
Hart-Parr	30	30	895	4	Own	2-6½x7	K,D.	3
‡Hart-Parr		....	1695	4	Own	6½x7	K,D.	..
Heider	D	9-16	870	4	Wauk	4-4¼x5½	G,K	2
Heider	C	12-20	995	4	Wauk	4-4½x6¾	G,K	3
Heider	Cult	5-10	800	4	LeR.	4-3½x4½	Gas.	1
Huber Light 4		12-25	985	4	Wauk	4-4½x5¾	G or K	3
Huber Super 4		15-30	1885	4	Midw.	4-4½x6	Gas	3
Illinois	C	15-30	....	4	Clim.	4-5 x6½	G,K	4
Indiana	F	5-10	665	2	LeR.	4-3½x4½	Gas.	1-2
International		8-16	†670	4	Own	4-4¼x5	G,K,D	2
Internatl.Titan		10-20	†700	4	Own	2-6½x8	G,K,D	3
International		15-30	1750	4	Own	4-5¼x8	G,K,D	4
J-T	N	25-40	3000	*2	Clim.	4-5x6½	G,K,D	3-4
Kinkade		1½	190	1	Own	1-3 x3	Gas.	..
La Crosse		12-24	985	2	Own	2-6 x7	G,K	3
Lauson	5	12-25	1295	4	Midw.	4-4½x5¼	Gas.	3
Lauson	21	15-30	1675	4	Beav.	4-4¾x6	G or K	3-4
‡Lauson Road		15-30	2000	4	Beav.	4-4¾x6	K	..
Leader	B	12-18	685	4	Own	2-6 x6½	G,K,D	2-3
Leader	N	16-32	1725	4	Clim.	4-5 x6½	G,K	3-4
‡Leader	GU	18-35	2150	*2	Clim.	4-5 x6½	G,K	3-4
Linn	H4J	40-	4500	*	Cont.	4-4½x5½	Gas	4
Linn	W	60	5000	*	Wauk	4-5 x6¼	Gas	6
Little Giant, B		16-22	2200	4	Own	4-4½x5	K	4
Little Giant, A		26-35	3300	4	Own	4-5½x6	K	6
Lombard.1922		85-150	7950	*2	Wisc.	6-5½x6¾	Gas.	16
Lombard.1922		50	5300	*2	Wisc.	4-4¾x6½	Gas.	6-10
MerryGar1922		2	210	2	Evin	1-2½x2½	Gas.	..
Minne...All-P		12-25	800	4	Own	4-4½x7	G or K	3
Minne. Gen.P		17-30	1600	4	Own	4-4¾x7	G or K	3-4
Minne. Med.D		22-44	2650	4	Own	4-6 x7	G or K	5-6
MinneHeavyD		35-70	3850	4	Own	4-7¼x9	G or K	8-9
Mohawk .1922		8-16	650	2	Light	4-3½x4½	K or G	1-2
Moline Univ D		9-18	650	2	Own	4-3½x5	Gas.	2-3
Moline Orch		9-18	....	2	Own	4-3½x5	Gas.	2-3
‡Monarch		20-30	3500	*2	Beav.	4-4¾x6	G,K,D	4
Motor Macult,		1½	195	2	Own	1-2¾x3½	Gas.	..
NB	1	3-6	425	4	Own	2-3¾x4	Gas.	1
Nichols-Shep.		20-42	2650	4	Own	8 x10	G or K	3-6
Nichols Shep.		25-50	3000	4	Own	9 x12	G or K	4-7
Nichols-Shep.		35-70	3650	4	Own	-10½x14	G or K	8-10
Nilson Senior		20-40	1975	5	Wauk	4-5 x6¼	G,K	4
Oil Pull	K	12-20	....	4	Own	2-6 x8	K,D	3
Oil Pull	H	16-30	....	4	Own	2-7 x8½	K,D	4
Oil Pull	G	20-40	....	4	Own	2-8 x10	K,D	5-6
Oil Pull	E	30-60	....	4	Own	2-10x12	K,D	8-10
¶Oldsmar	K	2½-5	$225	4	Own	1-5½x5½	Gas.	1
Peoria	L	12-25	1600	4	Clim.	4-5 x6½	G,K	3
Pioneer	G	18-36	1750	4	Own	4-5½x6	G,K,D	4
Pioneer	C	40-75	3550	4	Own	4-7 x8	Gas.	10
Plowman	A	15-30	1295	4	Buda	4-4½x6	G,K	3-4
Reliable		10-20	390	4	Own	2-6 x7	Ker.	2
Rex		12-25	1600	4	Wauk	4-4¼x5¾	G or K	3
Russell		12-24	1500	4	Own	4-4¼x5¾	G or K	2-3
Russell		15-30	2200	4	Own	4-5 x6½	G or K	3-4
Russell		20-35	3000	4	Own	4-5½x7	G or K	4-5
Russell		30-60	5000	4	Own	4-8 x10	G or K	8-10
Samson	M	....	445	4	Own	4-4 x5½	G,K	2
Sandusky	J	10-20	1250	4	Own	4-4¼x5¼	G,K,D	2
Sandusky	E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
¶Shelby		1	150	3	B & S	1-2½x2½	G	..
Shelby	D	15-30	....	4	Beav.	4-4¼x6	G,K	3
Shelby	C	9-18	....	4	Wauk	4-3¾x5¼	G or K	2
Steady Pull		12-21	1485	4	Own	4-4 x5	Gas.	3
Tioga		18-32	....	4	Wisc.	4-4½x6	Gas.	3-4
Toro Cultivator		6	750	3	LeR	4-3½x4½	Gas.	2
ToroTractor'22		6-10	495	3	LeR	4-3½x4½	Gas.	2
Townsend		10-20	800	2	Own	4-6½x7	Ker.	2-3
Townsend		15-30	1350	2	Own	4-7 x8	Ker.	3-4
Townsend		25-50	2500	2	Own	4-8½x10	Ker.	4-8
Traction Motor		40-50	....	4	....	8-3½x5	Gas.	4-5
Traylor	TB	6-12	500	4	LeR.	4-3½x4½	Gas.	1-2
Trundaar	10	25-40	3750	*2	Wauk	4-5 x6½	G or K	4
Twin City		12-20	1200	4	Own	4-4¼x6	G,K	3
Twin City		20-35	2750	4	Own	4-5½x6¾	G,K	5-6
Twin City		40-65	4750	4	Own	4-7¾x9	G,K	8-10
Uncle Sam C20		12-20	1295	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19		20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21		20-30	1895	4	Beav.	4-4¾x6	G or K	3-4
Utilitor	501	2½-4	295	4	Own	1-3½x4½	G	1
Utilitor	501A	2½-4	340	4	Own	1-3½x4½	G	1
Wallis	K	15-25	....	4	Own	4-4¼x5¾	G,K	3
Waterloo	N	12-25	675	4	Own	2-6½x7	Ker.	3
Wetmore 21-22		12-25	1185	4	Wauk	4-4 x5¾	G,K	3
Whitney	D	9-18	595	4	Own	2-5½x6½	Gas.	2
Wichita	T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin	E	16-30	1850	4	Clim.	4-5 x6½	G or K	3
Wisconsin	F	20-40	2050	4	Wauk	4-5 x6¼	G or K	4
Wisconsin	H	22-40	2550	4	Clim.	4-5½x7	G or K	4-6
Yuba	12-20	12-20	2400	*2	Wisc.	4-4½x6¾	G,K,D	3
Yuba	15-25	15-25	2750	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba	20-35	20-35	3900	*2	Wisc.	4-5¾x7	G,K,D	4
Yuba	25-40	25-40	4250	*2	Wisc.	4-5¾x7	G,K,D	..
‡Yuba		25-40	4750	*2	Yuba	4-5½x7	D	..
Zelle		12-25	....	4	Buda	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas Evin.—Evinrude. Here.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type. †Price includes plows. §Track Runner. ‡Industrial Tractor. ¶Garden Tractur. **Steam Tractor.



Walker Jump Jack
—One Stroke Lifts the Car

If your garage is minus a Walker Jump Jack, make that "minus" a "plus" while you're thinking about it. It will mean a lot of dollar "plusses" for you later on, represented by time saved in changing tires and increased revenue from handling more work than would otherwise be possible. ***Put a Walker Jump Jack on your garage staff today.***

Here is a Jack that has smashed all records for fast car lifting. It's an animated crow bar. Just shove it under the axle, pull the chain which releases the spring-jump lifting rack, pry down on the 6-ft. handle and the car is up! ***One stroke of the handle does the trick.*** It's almost an instantaneous, automatic action. One man can lift a ton load without more than half trying—and he doesn't have to be a Jack Dempsey, either. Changing tires becomes a quick, easy job. With the help of a Jump Jack a man can change two tires in the same length of time as he could change one by the ordinary method.

Talk with your jobber's salesman about Jump Jack. He will give you the full facts.

Walker JACKS

"Dependable in Emergencies"

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Racine :: Wisconsin

The Worlds Most Complete Line of Automotive Jacks

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ace.....F	G-B..	4-3½x5	114	32x4	$1295	$1295	....	....	$2295
Ace.....L	H-S..	6-3¼x5	117	32x4	2260	2260	....	....	3680
Ace.....C	Cont..	6-3⅜x5¼	123	33x4½	2975	2975	....	....	4500
Ambassador.....R	Cont..	6-3⅜x5¼	136	33x5	....	b4500	$4500	....	6500
American.....D-66	H-S..	6-3½x5	127	33x4½	b1885	1785	1850	....	2485
Anderson...Aluminum 6	Cont..	6-3½x4¼	114	32x4	....	1195	....	....	....
Anderson.....Series 40	Cont..	6-3¼x4½	120	33x4	2195	1650	1795	$2450	2550
Apperson.....8-21-S	Own..	8-3¼x5	130	34x4½	....	2620	2645	3625	3695
Auburn.....6-51	Cont..	6-3⅝x4½	121	32x4	1575	1475	....	2275	2345
Auburn.....6-51	Cont..	6-3⅝x4½	121	32x4½	....	n1995	1545	....	....
Bay State.....	Cont..	6-3½x4½	121	32x4	1800	1800	....	2400	2500
Bell.....4-32	H-S..	4-3½x5	114	31x4	1095	1095	....	....	....
Bell.....6-50	H-S..	6-3¼x5	124	32x4	1545	1545	....	....	....
Biddle.....B1 & B5	Buda..	4-3¾x5½	121	32x4	2950	b2950	....	3950	3950
Brewster.....91	Own..	4-4 x5½	125	32x4½	5000	5000	....	....	7000
Buick...1922-34-5-6-7-38	Own..	4-3⅝x4¾	109	31x4	865	885	u 725	1175	{1395 / 1325e}
Buick.....1922-41-4-5-47	Own..	6-3⅜x4½	118	33x4t	1175	1195	u975	1935e	1985
Buick. 1922-48-9-50-4-55	Own..	6-3⅝x4½	124	34x4½	n1625v	n1675v	1435	1895	2195
Cadillac.....61	Own..	8-3½x5½	132	33x5	3100	3150	3150	b3875	4100
Case.....X	Cont..	6-3⅜x4½	122	32x4½	1750	1790	....	2550	2690
Case.....W	Cont..	6-3⅝x5¼	129	34x4½	....	2200	2250	2850	3250
Chalmers.....1922	Own..	6-3¼x4½	117	32x4	1185	1185	....	1595	2295
Chalmers.....1922	Own..	6-3¼x4½	122	32x4	....	....	1345	....	....
Chandler.....Six	Own..	6-3½x5	123	33x4	1495	b1495	1645	b1995	2295
Chevrolet.....Superior	Own..	4-3⅛x4	102	30x3½	510	525	u425	{b840 / k680}	860
Chevrolet.....FB	Own..	4-3⅛x5¼	110	33x4	865	885	....	1325	1395
Cleveland.....41	Own..	6-3 x4½	112	32x4	1085	1095	n1260	1495	1585
Cole.....890	Nort..	8-3½x4½	127¼	33x5	2685	b2685n	2685	b3385	3685
Columbia.....De Luxe	Cont..	6-3⅝x4¼	115	32x4	1475	1475	b1475n	b1925	1995
Columbia.....Light Six	Cont..	6-3½x4¼	115	31x4	995	985	....	....	1395
Comet.....C-53	Cont..	6-3½x5¼	125	33x4½	....	1985	2085	....	2985
Crawford.....22-6-60	Cont..	6-3⅝x5¼	122½	32x4	3000	3000	3000	....	4500
Crawford-Dagmar...6-60	Cont..	6-3⅝x5¼	135	33x5	....	n3500	....	....	....
Daniels.....D-19	Own..	8-3½x5¼	132	33x5	a4350	b4350	4350	5250	6000
Davis.....71	Cont..	6-3½x4¼	114	31x4	....	1295	....	....	....
Davis.....61-67	Cont..	6-3⅜x4½	120	32x4	1595	1595	b1695	2095	2195
Dixie Flyer.....H-S-70	H-S..	4-3½x5	112	32x4	1175	1175	b1295	1545	1595
Dodge Brothers.....	Own..	4-3⅞x4½	114	32x4	850	880	....	980h	1440
Dorris.....6-80	Own..	6-4 x5	132	33x5	....	b3900	3950	4985b	5750
Dort.....19-14	D-Ly..	4-3½x5	108	31x4	885	885	....	{1265 / 1015k}	{1385 / 1095k}
Driggs.....	Own..	4-2⅝x4½	104	30x3½	1275	1275	....	....	1975
Duesenberg...Straight 8	Own..	8-2⅞x5	134	33x5	6500	6500	6750	7800	7800
Du Pont.....A	Own..	4-3⅛x5⅛	124	32x4½	3000	3200	....	3800	4000
Durant.....A-22	Cont..	4-3⅞x4¼	109	31x4	n890	890	....	1365	1365
Durant.....B-22	Anst..	6-3¼x4½	123½	32x4½	1600	1650	....	2250	2400
Earl.....40	Own..	4-3 x5¼	112	32x4	1485	1095	950u	b1395	1795
Elcar.....K-4	Lyc..	4-3½x5	118	33x4	1095	1095	n1095	1345	....
Elcar.....7-R	Cont..	6-3¼x4½	118	33x4	1395	1395	n1395	2065	2165
Elgin.....K-1	Falls..	6-3½x4¼	118	33x4	1345	1295	b1345	2195	2195
Essex.....	Own..	4-3⅝x5	108½	32x4	....	1095	....	1195k	{1895 / 1295k}
Ford.....T	Own..	4-3¾x4	100	30x3½	r319	s348	u285	580	645
Franklin.....9-B	Own..	6-3¼x4	115	32x4	1900	1950	u1750	2750	2850
Gardner.....T-R & G	Lyc...	4-3½x5	112	32x4	895	895	....	1095k	{1595 / 1345k}
Grant.....	Own..	6-3½x4½	116	32x4	1385	1385	....	1895	1945
Gray.....	Own..	4-3⅝x4	100	30x3½	....	490	....	....	760
H.C.S.....Series 3	Weid..	4-3⅝x5½	120	32x4½	2475	2475	....	3250	3475
Halladay.....4	Own..	4-3½x5	115	32x4	1095	1095	....	1990	2085
Halladay.....6	Own..	6-3½x5	115	32x4	1595	1595	....	2295	2395
Handley-Knight.....	Own..	4-4⅛x4½	125	32x4½	....	....	2650	3450	3450
Hanson.....30	Cont..	6-3½x4¼	114	31x4	....	905	....	....	....
Hanson Six.....60	Cont..	6-3⅝x4½	121	32x4	1595	1595	1795	b2475	2585
Hatfield.....A-42	H-S..	4-3½x5	115	32x4	....	1345	b1345	1950	1950
Haynes.....75	Own..	6-3½x5	132	34x4½	2395	b2395	2395	....	3395
Haynes.....55	Own..	6-3½x5	121	32x4½	1545	1495	....	2095	2395
Holmes.....Series 4	Own..	6-3½x4¼	126	34x4½	....	b2500	2500	b3300	3600
Hudson.....Super 6	Own..	6-3½x5	126	34x4½	....	b1645	1695	2570	{2650 / 1745k}
Huffman.....	Cont..	6-3⅝x4½	120	32x4	1395	1395	....	....	2295
Hupmobile.....Series R	Own..	4-3¼x5½	112	32x4	1150	1150	u1025	{1635 / 1335k}	1785
Jackson.....638	Cont..	6-3¼x4½	121	32x4½	....	1485	b1685	2985	2985
Jewett.....Six	Own..	6-3¼x5	112	31x4	a995	995	....	b1445	1465
Jordan.....MX	Own..	6-3⅛x4¾	120	32x4	1895	1795	....	2785	2785
Kelsey.....4	Grav..	4-3½x5	111	32x3½	....	985	....	....	1450
Kelsey.....6	Walk'r	4-3½x4½	118	32x4	....	1525	....	....	2175
Kenworthy.....8-90	Own..	8-3 x5¼	130	32x4½	5000	5000	5250	6000	6000
King.....K	Own..	8-3 x5	120	32x4½	1795	1795	b1795	2409	2550
Kissel.....45	Own..	6-3⅛x5½	124	32x4½	n2385	1885	2385	b2975	3075
Kline Kar.....6-55-K	Cont..	6-3⅝x4½	121	33x4	1690	1690	1690	2750	2890
LaFayette.....	Own..	8-3¼x5¼	132	33x5	3985	b4090	4090	5500	5500
Leach.....999	Own..	6-3⅝x5¼	134	32x4½	5500	5500	5500	5500	5500
Lexington.....23	Anst..	6-3¼x4½	128	32x4½	1695	{1695 / 2045n}	1795	b2345	2545
Liberty.....10-D	Own..	6-3½x5	117	32x4	1575	1395	1575n	{2085 / 1695k}	2245

NAME AND MODEL	Engine Make	Cylinders Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Lincoln.....	Own..	8-3⅜x5	136	33x5	$3800	b3800	$3800	$4400	$4700
Locomobile.....48	Own..	6-4½x5½	142	35x5	....	b7600	7600	10500	11000
Maibohm.....B	Own..	6-3½x4½	116	32x4	1395	1395	b1495	2165	2165
Marmon.....34	Own..	6-3⅜x5½	136	32x4½	3385	b3165	3165	3965	4385
Maxwell.....	Own..	4-3⅜x4½	109	31x4	885	885	....	1235	1335
McFarlan.....1922	Own..	6-4½x6	140	33x5	6300	b6300	6300	7500	7500
Mercer.....Series 5	Own..	4-3¾x6¾	132	32x4½	3950	b3950	c3950	4850	5250
Merit.....	Cont..	6-3¼x4½	119	32x4	1895	1895	....	....	....
Mitchell.....F-50	Own..	6-3½x5	120	33x4	a1590	1590	b1690n	b2050	2275
Mitchell.....F-50	Own..	6-3½x5	127	32x4½	....	....	1850	....	....
Monroe.....1922-S-9	Own..	4-3¾x4½	115	32x3½	950	950	....	....	....
Moon.....6-40	Cont..	6-3⅛x4¼	115	31x4	....	1295	....	....	1695
Moon.....6-58	Cont..	6-3⅞x4½	128	33x4½	1785	1785	1785	2785	2785
Nash.....691-96-97	Own..	6-3¼x5	121	33x4	1210	1240	b1395n	....	....
Nash.....692-94-95	Own..	6-3¼x5	127	34x4½	....	....	1390	b1890	2190
Nash Four.....41-4	Own..	4-3⅜x5	112	33x4	915	935	....	{a1385 / 1195k}	{1545 / 1275k}
National.....BB	Own..	6-3½x5¼	130	32x4½	a2475	b2475	2375	b3725	3825
Noma.....3C	Cont..	6-3¼x4½	128	32x4½	2500	b2500	c2600	....	3500
Noma.....1D	Bea..	6-3½x5¼	128	32x4½	3000	b3100	c3200	....	5500
Norwalk.....430-KS	Lyc...	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland.....6-44	Own..	6-2¾x4¾	115	32x4	975	{995 / u795}	b1165n	{b1445 / 1185k}	1545
Ogren.....6 T D Luxe	Cont..	6-3⅝x5¼	134	33x5	b3750	3750	3850	4500	4800
Oldsmobile.....43 A	Own..	4-3¼x5¼	115	32x4	1145	1145	b1265	1645	1755
Oldsmobile.....46	Own..	8-2⅞x4¾	122	33x4½	....	b1735	1735	....	2635
Oldsmobile.....47	Own..	8-2⅞x4½	115	32x4	1595	1595	b1595	2145	2205
Overland.....4	Own..	4-3⅜x4	100	30x3½	550	550	....	850	895
Packard.....Single-Six	Own..	6-3⅜x5	126	33x4½	2485	2485	u2250	3175	3275
Packard.....Single-Six	Own..	6-3⅜x5	133	33x4½	....	u2350	2685	....	3525
Packard.....Twin-Six	Own..	12-3 x5	136	35x5	3850	3850	3850	5250	5400
Paige.....6-44	Own..	6-3¼x5	119	32x4	1465	1465	u1290	1995	2245
Paige.....6-66	Cont..	6-3¾x5	131	33x4½	a2495	n2245	2195	3100	3155
Paterson.....22-6-52	Cont..	6-3⅜x4½	120	32x4½	....	1390	1425	2305	2365
Peerless.....56-S-7	Own..	8-3¼x5	128	33x5	....	b2990	2990	b3400	3990
Pierce-Arrow.....	Own..	6-4 x5½	138	33x5	5250	b5250	5250	6800	7000
Pilot.....6-50	H-S..	6-3¼x5	126	32x4½	2050	2000	2050	2950	3000
Premier.....6-D	Own..	6-3⅜x5½	126¾	33x5	3150	b3100	3250	4300	5100
Premocar.....6-40-A	Falls..	6-3½x4¼	117	32x4	1095	1095	....	1750	1825
R & V Knight.....R	Own..	4-3¾x5	116	32x4	....	1665	....	2385	2475
R & V Knight.....J	Own..	6-3½x4½	127	32x4½	2475	b2475	2475	3015	3105
Reo Series.....T6 & U6	Own..	6-3½x5	120	33x4	1595	n1645	1485	b2355	2435
ReVere.....C	Dues..	4-4¼x6	131	32x4½	3200	3200	3200	....	4000
Rickenbacker.....A	Own..	6-3½x4¾	117	32x4	....	1485	....	1885	1985
Roamer.....6-54-E	Cont..	6-3½x5¼	128	32x4½	2850	b2585	2785	3850	3850
Roamer.....4-75-E	Dues..	4-4¼x6	128	32x4½	3985	b3585	b3750n	....	b4650
Rolls-Royce.....	Own..	6-4½x4¾	143½	33x5	....	10,900	....	....	....
Saxon.....125	Own..	4-3½x5	112	32x4	1195	1195	....	1795	1795
Sayers Six.....DP	Cont..	6-3¼x4½	118	33x4	1645	1645	....	2645	2645
Seneca.....L-2 & O-2	Lyc...	4-3½x5	108	30x3½	875	875	....	....	....
Seneca.....50 & 51	Lyc...	4-3½x5	112	31x4	1095	1095	....	....	....
Sperling.....A	Supr..	4-3⅜x5	114	32x4	980	980	....	1685	1685
Standard.....98	Own..	8-3½x5	127	34x4½	2150	b2500	2500	2750	3200
Stanley.....	Own..	2-4 x5	130	32x4½	2700	2700	2700	3775	3950
Stanwood Six.....	Cont..	6-3½x4½	118	33x4	1765	1765	....	2750	....
Star.....	Cont..	4-3½x4¼	102	30x3½	r319	s348	u285	580	645
Stearns-Knight....SKL4	Own..	4-3⅞x5⅝	125	34x4½	2250	2250	2450	3150	3450
Stearns-Knight.....6	Own..	6-3⅜x5	130	34x4½	2700	2700	2850	3350	3700
Stephens.....90	Own..	6-3½x4½	122	33x4½	1575	b1595	c1625	2450	2550
Stevens-Duryea.....E	Own..	6-4⅞x5½	138	35x5	7250	b6900	6800	u5600	b8900
Studebaker....Light Six	Own..	6-3½x4½	112	32x4	975	975	u785	1225	1550
Studebaker..Special Six	Own..	6-3½x5	119	32x4	1250	1275	b1275	1875	2050
Studebaker.....Big Six	Own..	6-3⅞x5	126	33x4½	u1300	1650	n1785	2275	2475
Stutz.....	Own..	4-4¾x6	130	32x4½	2450	b2790	c2640	3490	4450
Templar.....A-445	Own..	4-3⅜x5½	118	32x4	2025	2125	b2175	2650	2785
Tulsa.....E-1-2-3	H-S..	4-3½x5	117	33x4	1175	1175	....	....	....
Velie.....48	Cont..	6-3¼x4½	115	32x4	1585	1585	b1800	2485	2485
Velie.....34	Falls..	6-3½x4½	112	32x3½	1235	1235	....	1750	2085
Velie.....58	Own..	6-3½x4¼	115	32x4	1275	1275	....	2185	2185
Washington.....C	Cont..	6-3⅜x4½	120	32x4	....	1785	....	....	2285
Westcott.....C-48	Cont..	6-3½x5¼	125	32x4½	....	....	1890	....	2890
Westcott.....A-44	Cont..	6-3¼x4½	120	32x4	....	1690	n1890	....	2690
Wills Sainte Claire..A-68	Own..	8-3¼x4	121	32x4½	2475	2475	....	3275	3475
Willys-Knight.....20	Own..	4-3⅜x4½	118	32x4	1350	1375	....	1875	2095
Winton.....40	Own..	6-3¾x5¼	132	35x5	3400	n3600	3400	b4450	4550

a—3-passenger, b—4-passenger, c—6-passenger, n—Sport, h—All Metal Type, k—Soft Top Type, u—Chassis Price, r—Price without starter and demountable rims. Price with starter and demountable rims $414. s—Price without starter and demountable rims. Price with starter and demountable rims $443. t—Model 47-34x4½ Tires. v—Tire Sizes 32x4½. e—Touring Sedan.

Engine Make: Anst—Ansted. Bea—Beaver. Cont—Continental. Curt—Curtis. D.Ly—Dort Lycoming. G-B—Grey Beal. H-S—Herschell-Spillman. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenberg. Supr—Supreme. Weid—Weidely. Wisc—Wisconsin